



THE ANNALS  
AND  
MAGAZINE OF NATURAL HISTORY.  
[NINTH SERIES.]

No. 14. FEBRUARY 1919.

XIII.—*New and insufficiently-known Moths in the Joicey Collection.* By LOUIS B. PROUT, F.E.S.

In the following descriptions it is to be assumed that all the types, paratypes, etc., enumerated are in the collection of J. J. Joicey, Esq., unless otherwise specified.

In working out the Noctuidæ, subfamily *Catocalinæ*, which form the great bulk of the paper, I am very largely indebted to my sister Miss A. E. Prout, who is at present arranging this family in Mr. Joicey's collection. Sir George F. Hampson has also kindly given his advice on some points:

Family *Arctiidae*.

Subfamily *LITHOSIINÆ*.

1. *Chionæma gonypetes*, sp. n.

♂.—38–40 mm.

Head white, face narrowly red below, palpus and post-orbital rim red. Collar orange-red. Thorax white; patagia and tegulae edged with red. Legs partly white (becoming yellowish on tarsi), partly orange-red. Abdomen orange, beneath white.

*Fore wing* with the lobes of underside formed about as in *conclusa*, Walk. (not quite so broad as in *axiologa*, Swinh., and *perornata*, Walk.), the proximal elongate, the distal circular, some rough orange-red hair-scales behind the proximal; above white, costal edge very narrowly red to

Ann. & Mag. N. Hist. Ser. 9. Vol. iii. 12

antemedian line; subbasal markings consisting of a small triangular red mark on costa, a black dot in cell, and an oblique, red, black-mixed dash behind  $SM^2$ ; lines red; antemedian rather thick, straight, from before one-third costa (where it is proximally edged by a few black scales) to beyond one-third hind margin; postmedian arising on costa about midway between subbasal mark and apex, strongly oblique outwards to  $M^1$ , here sharply bent, then straight to hind margin near tornus; a large anterior and a minute posterior black cell-dot; a red costal mark shortly beyond the postmedian line, connected with it by a faint reddish mark (really the reddened tips of the costal fringe); terminal line orange, thickening at apex.

*Hind wing* red-orange or orange-red, above with costal margin pale.

*Fore wing* beneath indefinitely mottled with ochreous and orange, posteriorly whitish; base of costa and lobes redder; costal edge whitish in front of the lobes; antemedian and postmedian lines present, but indistinct.

Mindanao, Philippines (*J. J. Mounsey*), 2 ♂♂. Probably near *axiologa*, Swinh.; may be placed as No. 648 c in the subfamily.

## 2. *Chionæma brunneistriga*, sp. n.

♀.—19 mm.

Closely similar to *rubristriga*, Holl., the red markings light ochreous-brown.

*Fore wing* with antemedian line strongly bisinuate; postmedian rather thick, rather strongly angulated outwards in middle; three black-brown subapical spots, the middle one (between  $R^1$  and  $R^2$ ) well developed, the anterior and posterior ones minute.

Fort Crampel, French Congo.

Possibly a form of *rubristriga*, Holl., as the colour is known to be somewhat variable, and specimens of apparently that species from Sierra Leone and Gold Coast in coll. British Museum show faint traces of a brownish subterminal spot between  $R^1$  and  $R^2$ , but the antemedian line seems too different, and the Cameroon series in coll. Joicey shows no transitions towards the new form.

## 3. *Chionæma additicia*, sp. n.

♀.—22 mm.

Closely similar to *basisticta*, Hampson., slightly broader-winged. Head white.

*Fore wing* with the markings yellowish ochraceous

costally, becoming redder posteriorly; an additional black dot, placed on DC<sup>4</sup>; terminal line broken into dots except towards apex.

Pujehun (Pujeon), Sierra Leone.

Family Noctuidæ.

Subfamily CATOCALINÆ.

4. *Acanthodica albiplena*, sp. n.

♂.—46 mm.

Head and body coloured as in the lighter examples of *splendens*, Druce.

*Fore wing* reddish brown mixed with grey and with purplish brown, slightly lighter than in *splendens*; the fine, black, green-edged lines as in that species; white subbasal and inner-marginal spots larger; reniform stigma almost wholly white, broad posteriorly; the spot behind it also whiter than in *splendens*, larger and less round, anteriorly almost reaching M just proximal to the hinder angle of cell; proximally to these, two much smaller round white spots, the anterior (indicated, though minuter and less conspicuous, in *splendens*) placed in the cell near its end, the posterior (larger and slightly more proximal) in the angle of M with M<sup>2</sup>; white inner median area clearer than in *splendens*, its anterior extension prolonged, almost confluent with the reniform; terminal area as in *splendens*.

*Hind wing* almost entirely glossy white, only with the hair-scales and fringe of abdominal margin light brown, and with a row of dark vein-dots slightly nearer the termen than those of *splendens*; a blackish terminal line, thickening at apex and becoming obsolete just behind M<sup>2</sup>, reappearing as a slight spot at end of SM<sup>2</sup>; fringe light brown, between M<sup>2</sup> and SM<sup>2</sup> and between SM<sup>2</sup> and tornus white.

*Fore wing* beneath similar to that of *splendens*, but lighter. *Hind wing* beneath predominantly white; costal area moderately irrorated with brown, with a broad dark mark from anterior extremity of DC to costa, the postmedian dots commencing at an oblique, somewhat curved dark costal streak, a small dark dash on middle of submedian fold, the terminal dark band (usually well developed in *splendens*) almost entirely obsolete except at apex.

Minca, Colombia, 2000 feet (H. H. Smith).

5. *Acanthodica sinuilinea*, sp. n.

♂.—46-49 mm.

Head and body coloured as in the lighter examples of

*splendens*, the contrast of colour between patagia and tegulae rather sharper.

*Fore wing* coloured and marked nearly as in *splendens*, but easily distinguished as follows: subbasal white mark more strongly developed, with more conspicuous M-shaped distal edge; reniform stigma (on an average more mixed with white) more strongly constricted in middle, 8-shaped or spectacle-shaped (the deeper indentation being in proximal side); postmedian line *incurved between R<sup>2</sup> and M<sup>1</sup>*. \*

*Hind wing* whiter than in *splendens*, the dark borders similar, but on an average appreciably narrower, often almost obsolete in posterior part.

*Underside* nearly as in *splendens*, the dark border of the hind wing tending to obsolescence posteriorly.

Yahuar Mayo, S. Peru, 1200 feet, May-July, 1912 (*Watkins*), type; others from the same locality, from La Union, Rio Huacamayo, Carabaya, S.E. Peru (*Ockenden*), and from Rio Ampiyacu, Putumayo, Peruvian Amazons.

A ♀ from Contamana, Rio Ucayali, Peru, Nov.-Dec., 1912, which—on account of the curved postmedian line—probably belongs here, has almost the whole fore wings whitened from base to the reniform and the pale patch behind it, only an irregular costal border of about 2 mm. width (encroached upon at the subbasal white mark) and a spot on hind margin proximal to the antemedian line remaining normally coloured; hind wing with the dark borders broad, as in *splendens*, of which the ♀ is also unknown. As the three white central spots—the reniform and the spots placed proximally and posteriorly thereto (which are all discernible through their purer white outlines on the whitish area)—are all enlarged, this is possibly a species distinct from both those named.

#### 6. *Acanthodica caelebs*, sp. n.

♀.—44-46 mm.

Head and body coloured nearly as in *xylinoides*, Schaus, the dark brown admixture rather stronger, especially on vertex, which in *xylinoides* generally remains clear ochreous-brown; "patagia" edged with bluish- or greenish-white proximally.

*Fore wing* ochreous brown suffused with red-brown, least heavily in costal region; a black longitudinal line running from near base to termen, in cell and between R<sup>1</sup> and R<sup>2</sup>; markings otherwise nearly as in *xylinoides*, but with the dark marks in anterior part quite small and weak and with

a conspicuous grey-white patch behind cell near base, as in *fosteri*, Hmps. n.

*Hind wing* with termen fuller in middle than in *xylinoides* (shaped more as in *fosteri*), the apex consequently less pointed; coloration nearly as in the darkest *xylinoides*, but slightly more clouded still, at least in apical and distal region.

*Underside* much as in heavily-marked *xylinoides*, but with the longitudinal line of upperside developed in distal half.

Minca, Colombia, 2000 feet (H. H. Smith), type and another ♀.

Perhaps the ♀ to *xylinoides*, which occurred with it in the same locality—which, however, is undoubtedly very rich in Noctuidae. Unfortunately, ♀ ♀ of many of the species are still unknown.

#### 7. *Agonista endochrysa*, sp. n.

♂.—96-98 mm.

Head and thorax above velvety black-brown; pectus chocolate-brown, posteriorly mixed with ochreous; hind coxa, femur, and tibia predominantly ochreous; abdomen golden yellow, dorsal surface anteriorly black-brown, narrowing off to a point about the fifth segment.

*Fore wing* velvety black-brown; fringe golden yellow, becoming black-brown behind SM<sup>2</sup>.

*Hind wing* velvety black-brown, somewhat lighter apically; abdominal margin golden yellow; fringe golden yellow from tornus to before M<sup>2</sup>.

*Fore wing* beneath dull chocolate-brown, rather darker basally; a small indistinct dark spot at end of cell; a row of minute yellow subterminal dots between the veins (smaller than those of *platani*): fringe yellow. *Hind wing* beneath slightly darker, the abdominal region yellow about to M<sup>1</sup>, more or less heavily irrorated with dark brown at the junction of the two colours.

N. Borneo, the type from Sandakan (A. L. Cook).

Possibly the Borneo race of *endoleuca*, Guen. Has been misidentified as *platani*, Pag. (compare Hmps. n., Cat. Lep. Phal. xii. p. 268). The true *platani*, from Palawan, is very different and should form a separate section of the genus, with normally shaped ♂ hind wing (not elongate to tornus; termen convex); the absence of yellow on the abdomen, presence of a golden-yellow terminal band on hind wing from tornus to R<sup>2</sup>, narrower yellow abdominal margin above, more extended yellow abdominal region of hind wing beneath, and pale yellow tornus of fore wing beneath, further distinguish the Palawan species.

8. *Nyctipao hieroglyphica tenebrata*, subsp. n.

♂.—Differs from *N. hieroglyphica* in the complete absence of the pale postmedian markings on both surfaces of the fore wing.

♀.—Pale markings much reduced, especially on the underside; subapical streak of fore wing very narrow.

N. Borneo, type ♂ and allotype ♀ (Sandakan).

Misidentified by Hampson as *purpurata*, Druce, but differing in the venation of the fore wing (see Hampson's excellent classification in Cat. Lep. Phal. xii. p. 273 seq.) and slightly in the hind wing.

9. *Nyctipao albicrustata*, sp. n.

♀.—100 mm.

Head and body brown, the upperside of thorax strongly, of abdomen less strongly, darkened. Fore and middle legs predominantly deep brown.

*Fore wing* with the colours and pattern arranged as in ♂ *leucotania*, Guen. (Hmps., Cat. Lep. Phal. xii. t. cccvii. f. 7), but less tinged with ochreous or reddish; proximal area more uniformly dark, the antemedian line (often distinct in *leucotania*) consequently almost entirely obsolete; white band outside median line broad from SC to beyond R<sup>2</sup> (5 mm. in cellule 7); subterminal white spots anteriorly placed further from termen, the series consequently forming a less acutely angulated line; the subcostal one considerably more elongate (anteriorly 8 mm.), the second also elongate (circ. 4 mm.), the rest moderate, wedge-shaped or triangular, posteriorly ill-defined.

*Hind wing* with white subapical spot longitudinal, not oblique; subterminal otherwise obsolescent, almost parallel with postmedian throughout.

Fore wing beneath with the white submarginal spots greatly enlarged, as compared with those of *leucotania*, the first (as above) 8 mm., the second and third larger than above, connected with an ill-defined pale shade proximally, those in cellules 5, 4, and 3 very large (9–10 mm.), the former two proximally reaching the median line. Hind wing beneath with the first white subterminal spot as above, the second moderate, the rest present but indistinct, forming a nearly straight line, in sharp contradistinction to the highly-angled one of *leucotania*.

Key Islands, Jan.–March 1916 (*W. J. C. Frost*).

Belongs to the same structure group as *leucotania*, which also inhabits the Key Islands, but abundantly distinct.

10. *Enmonodia villicosta*, sp. n.

♂.—86 mm.

Closely akin to *pudens*, Walk., of which it might be regarded as a local race. Coloration the same. Hair of hind tarsus only clothing the first joint (one hind leg only sound); that of pectus and femora brighter scarlet (in *pudens* more orange-ochreous, mixed or tinged with scarlet).

*Fore wing* with the variable dark spot near base of M<sup>1</sup> in both the known examples small, its longitudinal measurement exceeding the transverse.

*Hind wing* with the almost straight median line showing behind R<sup>1</sup> a very slight tendency to curve inwards, not (as in *pudens*) outwards; the postmedian dots rather nearer to and more nearly parallel with the median than is usual in *pudens*; a rather distinct narrow dark border, as in *senisecc*, Guen., and *lactipez*, Hampson; *beneath with the long woolly hair occupying also the costal region*.

Mindanao, Philippines (*Mounsey*), type and another.

As the androconial hairs of the hind wing are evidently liable to abrasion, it is just possible that bred specimens of *pudens* would show them also in the mid-costal region; but many specimens have been examined (as also by Hampson) without revealing an indication of this.

11. *Speiredonia remota capitulifera*, subsp. n.

♂.—Differs from *remota remota*, Feld. (S. Moluccas to Aru) in having the median area of the *fore wing* darker, more uniform (in *r. remota* distally fading out to nearly the ground-colour), the head of the comma-shaped mark reduced in size (about  $3 \times 1.5$  mm.), entirely filled in with black.

*Hind wing* with central part blacker than in *remota remota*.

Bankala, Celebes (*J. C. van Hasselt*).

A ♀ ("Celebes ex Marsden"), possibly representing a different race, is smaller (56 mm.), the *fore wing* with the discoidal mark not reduced, the median line interrupted by it, the postmedian approximated to it (thus occupying about the position of the median of *remota remota*), the subterminal less deeply dentate, the hind wing with the whitish subterminal line much more distally placed.

Genus LAGOPTERA, Guen.

Guenée's note (Spec. Gén. Léop. vii. p. 223) on the short third joint of the male palpus holds in all the species



represented in the Joicey collection, and presumably throughout the genus. Snellen's challenge of it (Tijd. v. Ent. xxviii. p. 11) was due to his erroneous composition of the genus, and it is curious that Hampson, who has purified it, has not noticed the palpal structure in more detail.

12. *Lagoptera rubida velutina* (Warr., MS.?), subsp. n.

♀.—Differs from *rubida rubida*, Walk., as follows: Pectus much darker, strongly mixed with dark grey-brown.

*Fore wing* with posterior spot of reniform stigma (not mentioned in Hampson's description) much larger, nearly confluent with anterior spot, pale with dark centre; anterior part of postmedian line more sharply defined; pale distal border of more uniform width nearly to tornus, then obliquely cut off, the ground-colour running to tornus.

*Hind wing* with the blue-white band at least twice as broad (5 mm.), narrowing gradually at its extremities.

*Underside* rather more smoky than in *r. rubida*.

Arfak Mountains, Dutch New Guinea (Pratt), type and another, the type from Angi Lakes, 6000 feet, March 1914; the type labelled by Talbot "*Lagoptera rubida velutina* Warr.," which must be an unpublished name.

Perhaps a separate species.

13. *Lagoptera ochrobrunnea*, Strand.

*Lagoptera inversa* ab. *ochrobrunnea*, Strand, Arch. Nat. lxxix. A, (8) p. 71 (1914) (= ab. 1, Hampson, Cat. Lep. Phal. xii. p. 419).

It was overlooked by Hampson that this is a perfectly distinct species, and the differentiation from true *inversa*, Walk. (= *bivirgata*, Snell.), though just sufficient to give validity to Strand's name, needs supplementing.

♂ ♀.—Size and nearly shape of *inversa*, distal margin of hind wing perhaps slightly more irregular. Head and thorax more tinged with ochreous, *pectus* and *underside of palpus* clear ochreous. Abdomen rather paler, beneath more mixed with ochreous.

*Fore wing* more ochreous-brown than in *inversa*; subbasal line obsolete, except for the feeblest traces costally; ante-median rather more proximally placed; median area ample (8-10 mm. wide), containing in addition to the reniform a black proximal dot representing the orbicular; distal area without pale line in front of  $R^1$ ; narrow pale terminal band rather broader and more variegated than in *inversa*.

*Hind wing* with the bluish-white band much narrower and shorter than in *inversa*; white patches on fringe more ochreous and more extended than in *inversa*.

*Underside*, excepting the apical and distal region of fore wing, rather paler than in *inversa*, on proximal part of hind wing more ochreous; tornal fringe of fore wing pale; fringe of hind wing as above.

Penang, type in coll. British Museum. N. Borneo, both sexes in coll. Joicey.

13 a. *Lagoptera ochrobrunnea nicanora*, subsp. n.

♂ ♀.—64–80 mm.

Pectus and legs strongly suffused with smoke-colour or blackish.

*Fore wing* more reddish than in the name-type, sometimes almost as in *L. inversa*; median area generally less broad than in *ochrobrunnea ochrobrunnea*, but with the postmedian line still running to hind margin, not (as in *inversa*) to subterminal line; distal area with dark vein-streaks stronger and more diffused; terminal area slightly broader, with the fine line at termen dentate, enclosing a whitish interneural dot in each tooth; palc parts of fringe more clouded with smoky scales.

*Hind wing* above blacker, with the thin white streak generally sharper.

*Underside* darker, especially on fore wing.

Dutch New Guinea: Wandammen Mtns., 3000–4000 feet, Nov. 1914 (*A. E. & F. Pratt*), type and another ♂; Arfak Mtns., 4000 feet, Feb.–March 1909 (*C. B. Pratt*), 1♂. Also from Sudest and Rossel Islands. Here belong further Hampson's Dutch New Guinea records of "*inversa*."

Labelled by Talbot "*Lagoptera inversa nicanora*, Warr.," which must be an unpublished name.

14. *Anua subdiversa*, sp. n.

♂.—64 mm.

Head and thorax red-brown; palpus black-brown, at base mixed with ochreous beneath; antennal shaft proximally white. Pectus and femora reddish ochreous; tibiae and tarsi predominantly blackish. Abdomen light ochreous brown, dorsally suffused with dark grey.

*Fore wing* red-brown, with scattered blackish irroration and with more or less strong dark leaden-grey suffusions, which leave freer the middle of the wing and a very ill-defined subterminal band; extreme costal edge ochreous proximally; antemedian line indistinct, dark, distally pale-edged, sinuous and strongly oblique outwards to submedian

fold, here angled, then oblique inwards to hind margin; orbicular represented by a small dot, as in the allies; reniform dark leaden-grey, with a few minute olive-whitish dots at its proximal posterior corner and two less minute dots (anterior and posterior) at its distal edge; postmedian line nearly as in *reducta*—bicurved anteriorly, but less bent in front of  $SM^2$  than in that species; subterminal nearly as in *reducta*, but better developed at costa, with a strong triangular black spot in cellule 6; subternal olive-grey patch larger, tripartite (crossing  $SM^2$ ); a row of pale dots close to termen.

*Hind wing* with the rounded lobe strong; colour of *xylochroa*, but slightly more ochreous at costa and with stronger black clouding in distal part; a dark cell-dot discernible; termen and fringe as in *reducta*.

*Fore wing* beneath paler ochreous-grey proximally than in the allies, the costal margin more smoky, the dark reniform sharply expressed; dark distal border sharply expressed, 8-9 mm. in breadth, continued proximally, though less sharply expressed, behind M to near base. *Hind wing* beneath similar to that of *reducta*, but with cell-mark present and with the dark distal border obsolete posteriorly.

Gambia (*A. Moloney*).

The ♀, from Friapere Forest, Coomassie, is similar above, though smaller, the fore wing with more uniform slate-grey suffusions, the hind wing darker; both wings beneath darker, the distal border of hind wing broader, complete. The species probably represents *reducta* (from Madagascar) in W. Africa, but in the absence of material from the intervening region I have not regarded it as a subspecies. It may be added that the group *Stenopsis*, Mab. (=Sect. D. Hmps., Cap. Lep. Phal. xii. p. 451), embraces also *david*, Holl., and *despecta*, Holl., the hind wing being produced in the whole group; of *david* the ♂ in coll. British Museum was damaged, of *despecta* Hampson knew only the ♀; "a" and "b" in Hmps. (pp. 451, 456) will therefore have to be merged.

#### 15. *Anua producta*, Holl.

This species is evidently somewhat variable, and it is very doubtful whether *xylochroa*, Druce, is anything more than a pale form of it, perhaps a Congo race. From Entebbe, Uganda, Mr. Joicey has a further form, or perhaps closely allied species, of a more reddish tone (particularly noticeable on the thorax and along posterior margin of fore wing), the

fore wing with less dark clouding, lines more sharply expressed, postmedian with the bends less deep, subterminal black markings in cellule 6 developed, terminal white dots obsolescent, underside paler proximally and especially between cell and the dark distal border. I provisionally name this *Anua producta rubescens*, subsp. n.

16. *Anua david*, Holl.

Probably also a rather variable species, recognizable in the ♂ by the bright ochreous hind wing beneath, in the ♀ generally by the bright ochreous fringes of the hind wing.

In a puzzling form from the Congo, however, which in the absence of the ♂ I provisionally refer to *david*, though it may probably prove a separate species, the fringes are more whitish yellow (intermediate towards those of the white-fringed allies); further distinguished by having the antemedian line oblique inwards from one-fourth costa, right-angled at M, in *david* from nearer base (mainly vertical), the postmedian more deeply bicurved anteriorly and bluntly angled inwards at submedian fold. I name this form ♀ *ab. camptogramma*, ab. n. (? bon. sp.).

*A. hypoxantha*, Hampson. (Nov. Zool. xxv. p. 206), may well be an eastern race of *david*.

17. *Anua violisparsa*, sp. n.

♂ ♀.—65–70 mm.

Face deep brown mixed with whitish, upper part with rufous; vertex bright rufous. Palpus black-brown, somewhat sprinkled (especially beneath) with whitish scales. Thorax above deep chocolate-brown, patagia and tegulae rufous; pectus and femora paler, more ochreous, the tufts of hair in the ♂ here bright orange-ochreous. Abdomen dark above, paler beneath.

Fore wing reddish chocolate irrorated with light violet scales, the irroration very sparse between postmedian and subterminal lines; antemedian line very indistinct, apparently less acutely angled behind M than in the allies; a minute blackish dot in cell; a faint grey discoidal spot about as in *reducta*; postmedian indistinct, slightly violet-edged proximally, shaped nearly as in *reducta* or rather more irregular; subterminal line fine, black, interrupted, irregularly dentate, rather deeply incurved in middle, generally swelling in cellule 6 into a more or less conspicuous black spot; a less interrupted pale green line edging the subterminal distally, except at costal and posterior margins;

a strong though not sharply defined band of light violet irroration in distal area, approximately parallel to the sub-terminal; terminal line reddish, inconspicuous, deeply crenulate, with a white dot at proximal extremity of each tooth.

*Hind wing* dark grey-brown, with a very narrow mid-terminal area of violet irroration; a crenulate dark terminal line, in the distal interspaces of which the shading is pale violet or whitish, fringe with slight pale irroration but nowhere distinctly white.

Fore wing beneath dull grey-brown, the base, costal edge, and broad distal margin darker. Hind wing beneath palest at the base, in the ♂ with the rest of the costal and a very broad apical region darkened, in the ♀ with more than the distal half of wings darkened, the two shades in neither sex sharply defined.

Bitje, Ja River, Cameroons, 2000 feet, wet season (*G. L. Bates*), type ♂ (April-March 1912) and 3 ♀ ♀ (Oct.-Nov. 1913, and undated). Also a ♀ from Entebbe, Uganda. Belongs to the group *Stenopis*.

#### 18. *Ercheia kebea borneensis*, subsp. n.

♀.—46-49 mm.

Thorax and *fore wing* (especially distal part) paler and more ochreous than in *kebea kebea* from New Guinea; tufts at end of "patagia" still brighter ochreous.

*Hind wing* less blackish than in *kebea kebea*, with some ochreous-brown admixture.

*Underside* much paler than in *k. kebea*, median band of hind wing twice indented behind middle.

Bidi, Sarawak, 1907-08 (*C. J. Brooks*), 2 ♀ ♀.

Perhaps the discovery of the ♂ will show this to be a separate species. The lobe on hind margin of fore wing is possibly less developed than in true *kebea*. Neither specimen shows any trace of the longitudinal line given by Hampson (*Cat. Lep. Phal.* xii. p. 483) as characteristic of the ♀, but this is only aberrational in the sex.

#### 19. *Ercheia amona*, sp. n.

♀.—50 mm.

Head and thorax whitish grey, mixed with dark brown; palpus ochreous-brown, mixed with dark brown; patagia and tegulae red-brown, mixed with white at edges. Metathorax and abdomen above darkened; underside of body

and legs mostly light ochreous-brown; hair of fore tibia partly white. Hind tibial spines concealed (wanting?).

*Fore wing* with hind margin lobed and excised nearly as in *kebea*, termen evenly curved, feebly subcrenulate, thus transitional between Hampson's two sections (Cat. Lep. Phal. xii. pp. 483, 484); very variegated; costal edge narrowly blackish, irregularly dotted with ochreous; costal area from base to postmedian line and a narrow area between postmedian and subterminal lines predominantly of a warm brown; a broad central streak from base nearly to postmedian and the terminal area predominantly vinaceous; posterior region proximally darker, mottled (red-brown, purplish, and blackish), marked with a few green scales near hind margin; a large greenish (distally paler and yellowish) blotch on hind margin proximally to the postmedian line, connected with a curved green line which anteriorly reaches  $M^2$  at its extremities; antemedian line obsolete; a minute dark dot in cell representing the orbicular; a longitudinal thick dark line from this to the postmedian, crossing the reniform, which is indefinitely outlined in green with a whitish dot at its anterior and a minute one at its posterior distal extremity; postmedian line black, irregularly edged with greenish proximally, mostly very fine, at its extremities dentate, between  $R^1$  and  $M^2$  strongly excurved; a large but ill-defined dark semicircular costal patch (shaded with blackish brown and purple) between the postmedian and subterminal; subterminal whitish, mixed with some green, blue, and yellowish scales, very fine and ill-defined anteriorly, fine and dentate between  $R^1$  and submedian fold, then thicker, straighter, and whiter to hind margin close to termen; some irregular dark dots and dashes close to termen, obsolete anteriorly; fringe olive-brown.

*Hind wing* blackish fuscous, at costal margin pale and glossy; a narrow postmedian pale band indicated between  $R^2$  and  $SM^2$ , but not sharply defined; fringes ochreous, slightly darker proximally and with a small fuscous spot opposite  $R^3$ .

Both wings beneath fuscous, strongly mixed in proximal half with bright ochreous; a slightly elongate dark cell-spot (best marked on hind wing); a narrow pale postmedian band, sharply edged proximally with dark fuscous; fringes and part of termen light ochreous, the fringe with dark admixture; distinct dark interneural dots close to termen.

Arfak Mtns., Dutch New Guinea, 6000 feet, March 1910 (C. B. & F. B. Pratt).

20. *Ercheia latistria*, sp. n.

♀.—55 mm.

Head and body coloured as in sharply marked *dubia*, the white segmental lines of abdomen rather strong. Wings shaped as in *dubia*, or with the termen slightly more crenulate.

*Fore wing* with the coloration and essential markings of *dubia* and *cyllaria*; probably equally variable; in the unique type the prominent dark markings are the "semi-circular" costal patch between submedian line and apex, the costal end of antemedian and median lines, and a thick black longitudinal streak behind cell and proximal part of M<sup>2</sup> from base nearly to postmedian line, here crossing M<sup>1</sup> and continuing in cellule 2 to termen; postmedian line moderately distinct; subterminal line weak; broad but ill-defined terminal clouding between R<sup>3</sup> and tornus.

*Hind wing* blackish fuscous, with clean white markings, similar to those of *quadriplaga*, Walk., but broader.

*Underside* as in the most sharply marked forms of *dubia*, the basal part of both wings being predominantly white; cell-spot of hind wing smaller than in most *dubia*.

Gilolo, 1904.

Perhaps a local race of *dubia*, in which case *quadriplaga* and *cyllaria* may also belong to the same protean species.

21. *Achæa cyanobathra*, sp. n.

♂.—47 mm.

Head and body dark brown, the abdomen darker dorsally; pectus and hair of femora and tibiae partly more ochreous; bases and tips of spines and narrow rings at ends of tarsal joints also pale.

*Fore wing* dark brown with very strong purple gloss (in the proximal area somewhat darker and much bluer, in the narrow terminal area wanting); a faint curved pale subbasal line from costa to SM<sup>2</sup>; antemedian line 6 mm. from base at both margins, almost straight, slightly waved, little paler than the ground-colour; a weak dark spot representing the orbicular stigma; reniform nearly as in *intercisa*, Walk., but less conspicuous on the darker ground; postmedian line feeble, apparently formed as in *leucopera*, Druce, the veins beyond it with slight pale dashes; a dark double subterminal line slightly nearer the termen than in *leucopera* and wanting the apical ornamentation of that species; a crenulate dark terminal line; fringe with slender pale line at base and a less sharply defined one in middle.

*Hind wing* blackish brown, with golden-yellow apical patch formed about as the white patch of *leucopera*.

*Fore wing* beneath dark brown, somewhat varied with paler brown proximally; reniform large, dark, immediately followed by an ill-defined oblique ochreous band which ends in a rather large tornal patch; a slightly curved dark postmedian line, crossing the ochreous band but not reaching hind margin; a few minute ochreous costal dots between postmedian and subterminal; subterminal distinct from costa to  $R^1$ , slightly bent outwards at  $SC^2$ ; terminal area pale from costa to  $R^2$ . *Hind wing* beneath dark brown with darker discoidal spot, curved median line, thick but ill-defined postmedian line (placed rather further from the median than in *leucopera*, at least posteriorly), and light ochreous-brown apical patch corresponding to the yellow patch of upperside, but containing dark brown irroration and crenulate terminal line thickened into dots on the folds.

Bitje, Ja River, Cameroons, 2000 feet, April-May 1912, wet season (*G. L. Bates*).

May be placed next to *intercisa*, Walk., but probably really much nearer *leucopera*, in spite of the considerable superficial differences.

22. *Achæa jamesoni*, sp. n.

♀.—64 mm.

Head and body light brown, mixed (especially abdomen) with grey.

*Fore wing* rather light brown, from base nearly to postmedian line with violaceous reflections; antemedian dark line indistinct, from scarcely beyond one-fourth costa, somewhat oblique outwards to cell, then less oblique, slightly sinuate to hind margin at about 8 mm. from base; reniform chiefly indicated by dark spots at its anterior and posterior extremity; median shade almost obsolete, excurved beyond cell; a white costal patch near apex, clouded, except at its edges, with light tawny brown, relatively larger and narrower than that of *mabillii*, Saalm., its distal edge markedly indented at  $SC^2$ ; postmedian line crenulate, arising from posterior margin of costal patch, more nearly parallel with termen than in *mabillii*, slightly bordered with whitish and ferruginous scales distally, a rather larger, ferruginous, white-edged spot developing at fold; no subterminal line; termen very narrowly shaded with pale violaceous except at extremities; faint traces of dark terminal line.

*Hind wing* grey-brown, darkest in distal part, especially



anteriorly; a small white apical patch, terminating at  $SC^2$ , where it attains a measurement of 3 mm.

Fore wing beneath coloured much as in *mabilii*, subapical patch much more irrorated (in the paratype obsolescent), postmedian line from  $R^1$  onwards almost parallel with termen, a dentate whitish subterminal indicated from costa to  $R^1$ , 3-4 mm. from termen, a conical white blotch from tornus obliquely to  $M^2$ . Hind wing beneath with weak dark cell-spot and curved median and postmedian lines and with traces of a dentate whitish subterminal.

Congo, Inkissi (Nkissi) River, Nkalama Falls, 18 April, 1887 (*Jameson*), ex coll. Druce, wrongly identified by Druce (*Jameson's 'Story of the Rear Column,'* p. 450) as *illustrata*, Walk. A damaged ♂ from Fantee, Gold Coast, also mentioned by Druce, likewise belongs here. The date of the type-specimen, correctly given as 18 April on the label, and confirmed from *Jameson's* itinerary (p. 24), is misquoted "18 August" on p. 450.

Allied to *mabilii*, but very distinct in the differently shaped non-latticed subapical patch, much straighter postmedian line, lack of white basal dot, etc.

### 23. *Achea ministra*, sp. n.

♂ ♀.—69-78 mm.

Near *serva*, Fabr., with which it has hitherto been confounded. Palpus of ♂ with third joint much longer, over one-half as long as second.

*Fore wing* with the markings and general coloration of the darker forms of *serva*, the blue-purple reflections and black-brown terminal clouding almost always strong; fringe from near apex to  $M^2$  pale buff, thus lighter (generally very much lighter) than in *serva*.

*Hind wing* with the interrupted oblique blue-white median band narrower than in *serva*, apical white spot generally smaller.

*Underside* darker than in *serva*, the whitish postcellular patch of fore wing smaller.

Dutch New Guinea: Wandammen Mtns., 3000-4000 feet, November 1914 (*A. E. & F. Pratt*), type and another ♂ and allotype ♀; Arfak Mtns. (*Pratt*); Upper Setekwa and near Oetakwa River (*Meek*). Key Islands, Dec. 1915-March 1916 (*W. J. C. Frost*).

Most of *Hampson's* *serva* ab. 1 (*purpurascens*, Strand, Arch. Nat. lxxix. A, (8) p. 73) belong to this species, but one or two, including the type-specimen, are dark aberrations of *serva*.

Rather variable, some forms superficially recalling *euscata*, Hampsn., but with the first joint of mid-tarsus not fringed above. In the type-form there are strong bright ferruginous shades proximally to the antemedian line between cell and hind margin, and again near tornus, but these vary much in intensity and are sometimes entirely obsolete.

In Hampson's figure of the palpus of "*serva*" (Cat. Lep. Phal. xii. p. 521, fig. 123), the third joint is shown about twice as long as it appears in the fully-clothed palpus of true *serva*, but not quite as long as in the allies. As the figure of the entire insect does not belong here (see *infra*), it is not improbable that the anatomical details were also drawn from one of the allies; but, in any case, the importance of absolute precision in dealing with the palpi of this group was evidently underestimated.

24. *Achæa pentasema*, sp. n. (præc. subsp. ?).

♂ ♀.—72–82 mm.

Likewise similar to *serva*, but with the ♂ palpus of the preceding species.

*Fore wing* ochreous to red-brown, the purple gloss weak or wanting; markings as in *serva* and *ministra*, the dark cloudings of terminal area rarely very strong; reniform stigma commonly (as in some *serva*) obsolete, except for the anterior and posterior black dots; postmedian line in the type shaped as in *serva*, in other examples less sharply bent at R<sup>1</sup>; fringe pale, but rarely as pale as in *ministra*.

*Hind wing* with all five spots sharply expressed, the terminal one near tornus broader and much better defined than in either of the allies (also better defined beneath).

*Underside* nearly as in the lighter and more variegated forms of *serva*, the blackish distal suffusion between postmedian line and tornus of fore wing always strong.

New Caledonia (*Layard*), type ♂. Also "Uvea, New Caledonia" (? Uvea), 1 ♂, Laucala, Fiji, 1 ♀, Suva, Viti Levu, 2 ♀ ♀, all in coll. Joicey. Lifu and Friendly Islands in coll. Brit. Mus.

Figured by Hampson, Cat. Lep. Phal. xii. p. 521, fig. 123, as *serva*.

25. *Achæa dmoř*, sp. n.

♂ ♀.—56–60 mm.

Head, thorax, and base of abdomen yellowish brown, sometimes with a rufous tinge; abdomen otherwise strongly

mixed with dark grey, the anal tuft pale; pectus and venter pale grey.

*Fore wing* moderately broad, costa curved towards the apex, which is minutely falcate, termen otherwise more convex than in *mercatoria*, Fabr.; light yellow-brown or red-brown, with strong vinaceous reflections—at least, in median area; distal area and costal edge generally more yellow; a white dot close to base; lines grey or blackish; subbasal faint and interrupted, obsolete posteriorly; ante-median fine, oblique, slightly crenulate, especially in anterior part; median rather thick, almost *straight*, bent proximad in front of C, placed beyond middle of wing; postmedian fine, finely crenulate-dentate, slightly-angled at  $R^1$ ; orbicular stigma represented by a black dot about 2 mm. from ante-median line, reuniform by an anterior and a posterior black dot, 2 or 3 mm. inside median shade, with a weaker dot more proximally placed between them; a small pale violet-grey or somewhat vinaceous apical patch; a row of minute paired interneural dots (proximally black, distally white) close to termen.

*Hind wing* dusky \*greyish-ochreous, becoming almost black distally between costa and  $M^2$  and with more irregular blackish admixture near tornus; a small whitish apical spot; an ill-defined light ochreous-brown band beyond middle, from  $R^1$  or  $R^2$  towards tornus, interrupted posteriorly; a light brown terminal patch towards tornus; fringe (with extreme termen) whitish from before  $R^1$  to behind  $R^2$ , otherwise brown.

Fore wing beneath light brown, violet-grey along costa and part of termen, somewhat clouded in cell and behind proximal half of  $M^2$ ; cell-spot large, crescentic, black, touching the faint median shade; postmedian black, forming a very slight regular curve; a large black blotch beyond this, mainly between  $R^2$  and  $M^2$ ; traces of a pale crenulate subterminal line; minute admarginal dots nearly as above, but with whitish shading proximally. Hind wing beneath pale grey, more brownish costally and apically than posteriorly; a sharp black cell-dot, which sometimes shows through on upperside; three (usually in part ill-defined) brown lines beyond, the second and third dentate, the latter ending in a dark spot close to tornus; admarginal dots nearly as on fore wing; fringe warm brown except about the radials, posteriorly in dark-marked specimens fuscous.

Central Madagascar, 2500 feet, Jan.—March 1911 (*F. B. Pratt*), 4 ♂♂, 2 ♀♀.

Differs from *mercatoria*, Fabr., in shape, in straight median

line of fore wing, less irregular postmedian and more ochreous hind wing, marked more as in *faber*, Holl. Rather variable in colour and especially in the strength of the markings; an aberration in which the antemedian lines are weak and the median shade strong and black may be named *ab. unilinea*, *ab. n.*

26. *Achea cymatias*, sp. n.

♂.—77–80 mm.

Head, thorax, and abdomen ochreous-brown, above darker. Palpus with third joint rather short. Antenna almost simple; mid-tarsus without hair; first and second joints of hind tarsus fringed with hair above.

*Fore wing* warm brown (ochreous mixed with dark olivaceous brown), between antemedian and median lines much paler, strongly overlaid with violaceous, in distal area variegated; antemedian line fine, almost straight, from one-third costa to two-fifths hind margin, whitish-edged distally; reniform narrow, crescentic, darkest and thickest at its ends, placed midway between antemedian and median; median line gently excurved in anterior part, incurved in posterior; postmedian from two-thirds costa to four-fifths hind margin, strongly bicurved (outwards between  $R^1$  and  $M^1$ , inwards between  $M^1$  and hind margin), dark-shaded proximally and edged by a fine white or whitish line distally; distal area whitish violaceous near the postmedian line and in an ill-defined oblique shade from middle of subterminal to termen about fold, narrowly darkened at termen from this point to near apex, otherwise mostly olive-brownish; an oblique blackish shade from apex towards outer lobe of postmedian; faint traces of zigzag whitish subterminal line; a black dot at fold close to termen; terminal dark line ill-defined; fringe with a pale line at base and a second beyond middle.

*Hind wing* more fuscous; an indistinct slightly curved oblique pale median line; very faint indications of other pale lines or shades distally; a whitish apical spot; termen and fringe nearly as on fore wings, the fringe paler anteriorly than posteriorly. Both wings beneath grey-brown with crescentic cell-mark (on hind wing rounder), curved median and crenulate postmedian line and vague pale crenulate subterminal, accompanied proximally by a dark shade; terminal area paler, especially in distal half, which contains a row of small interneural black dots.

Bitje, Ja River, Cameroons, 2000 feet (Bates), 3 ♂♂, the

type taken in 1915, the other two labelled "dry season" but not dated.

Perhaps a race of *hypopolia*, Hmps. (Nov. Zool. xxv. p. 208), from British Central Africa. Fore wing with ante-medial line more upright, postmedian more deeply bisinuate, and with violet shade in median area; hind wing with white apical spot.

27. *Achæa indistincta*, Walk.

This species, of which the type is in coll. Joicey, has been sunk by Hampson (Cat. Lep. Phal. xii. p. 538) to *ablnaris*, Guen. On account of the broader dark border of the hind wing (two-fifths of length of wing, against two-sevenths in *ablnaris*), combined with more angulated postmedian line on underside of both wings, it seems likely that it is really a separate species.

Costa Rica to Bogotá.

28. *Parallelia valga*, sp. n.

♀.—58 mm.

Head and body coloured as in *rigidistria*, Guen.; palpus with third joint considerably shorter than in the ♀ of that species, less than one-third as long as second joint.

Fore wing coloured as in the lighter forms of *rigidistria*; subbasal line as in that species; antemedial arising somewhat further from base, *strongly incurved* between SC and base of  $M^2$ , strongly oblique outwards to hind margin near median line; median line slightly interrupted outward near costa; postmedian line much less deeply crenulate than in *rigidistria*, with a single angle at  $R^1$ ; indications of a dark line from this angle to apex; subterminal further from termen, the dark shading beyond it rather weak; fringe light brown.

Hind wing with termen rather fuller near tornus than in *rigidistria*; less clouded with blackish; pale postmedian line wanting; tornal pale mark weak.

Underside rather paler than in most *rigidistria*; fore wing with the median line obsolete, postmedian extremely weak, arising further from termen than in *rigidistria*, apparently deeply incurved so as to reach postmedian angle of cell; hind wing with cell-dot replaced by a weak comma, median and postmedian lines approximated, especially posteriorly, the latter scarcely crenulate, subterminal chiefly shown by three or four weak yellowish spots in anterior part.

Khasia Hills (*Nissary*).

29. *Parallelia isotima*, sp. n.

♂ ♀.—29–36 mm.

Head and front of thorax yellowish brown; rest of thorax and abdomen brown-grey, the latter somewhat darkened dorsally. Fore leg (as in *humilis*, Holl.) somewhat darkened, the tarsal joints more markedly pale at the extremities than in that species.

Fore wing shaped and marked almost exactly as in *humilis*, more glossy, paler (especially at termen), olivaceous tinge rather more noticeable, postmedian line more decidedly incurved from R', thus forming an acuter angle at that vein.

Hind wing slightly less dark than in *humilis*, narrowly slightly paler at termen in posterior half; beneath with more extended white or whitish shading in terminal area (wanting in *humilis*).

Bitje, Ja River, Cameroons, 2000 feet (G. L. Bates), 5 ♂♂, 4 ♀♀. Also one from the same source in coll. Brit. Mus.

Apart from the smaller size and the distinctions above noted, *isotima* differs in having the genitalia smaller, more symmetrical (the right arm in *humilis* truncated), the penis differently shaped, etc.

30. *Parallelia curvisecta* (Warr., MS. ?), sp. n.

♂ ♀.—50–54 mm.

Similar to *interpensa*, Guen. Whitish lines on patagia and tegulae better developed.

Fore wing with basal area concolorous with proximal part of median; subbasal white half-line well developed; ante-median line curved, parallel or nearly parallel with median.

Hind wing paler beneath, especially in abdominal region.

Dutch New Guinea: Wandammen Mountains, 3000–4000 feet, November, 1914 (A. C. & F. Pratt), type ♂ and allotype ♀; Arfak Mountains.

Labelled by Talbot "*Parallelia curvisecta*, Warr.," which must be an unpublished name.

31. *Parallelia euryleuca*, sp. n.

♂.—70 mm.

Palpus with third joint short; head brown; thorax light brown; antennal shaft white proximally. Abdomen pale yellow-grey beneath, dark-mixed dorsally except at ends of segments; anal tuft strong, tinged with light brown.

Fore wing lighter brown than in the allies (*crameri*, Moore, etc.), with a faint olivaceous tinge; some violet-grey

irroration near base and at termen; basal area 9 mm. at costa, 10 mm. at hind margin, the straight white line which bounds it consequently less oblique than in *crameri*; a broad white median band very slightly irrorated in its proximal half with brownish; in the middle almost 6 mm. in width, broadening slightly at hind margin and slightly more at costa, its distal boundary being very gently curved; postmedian line slender, white, oblique outwards from costa 10 mm. before apex, right-angled at  $R^1$ , then oblique inwards, scarcely appreciably incurved in posterior part; a slight pale line from angle of postmedian to apex; distal area beyond these lines paler than the ground-colour; a slight dark dot on fold close to termen, with a weaker dark spot proximal to it between  $M^2$  and fold; terminal line slight and slender; a pale line at base of fringe.

*Hind wing* concolorous; median white band less sharply bounded, 5 mm. wide anteriorly, tapering posteriorly; terminal region marked as in *crameri*.

*Underside* yellow-grey, the fore wing paler and more glossy posteriorly; fore wing with proximal area very slightly dark-shaded, median line obsolescent, postmedian curved anteriorly, followed by some brown shading, which contains the pale subterminal line and an ill-defined blackish blotch between  $R^3$  and fold, a narrow distal shade of violet-grey; hind wing with faint angulated median, waved postmedian, and dentate pale subterminal, the latter placed on weak dark shading, space between median and postmedian lines more yellowish grey than the rest of the wing; both wings with the cell-dot of *crameri* obsolete.

Sandakan, N.E. Borneo (Pryer).

Larger and paler than *crameri*, with differently shaped markings and much more feebly marked underside.

### 32. *Parallelia adunca*, sp. n.

♀.—36 mm.

Head and thorax light brown; abdomen more greyish, underside paler. Palpus moderate, with third joint nearly half as long as second. Wings shaped and marked nearly as in *erectata*, Hmps., of which it may be a subspecies.

*Fore wing* light ochreous-brown with slight darker suffusions (especially in distal half of median area), but less reddish than in *erectata*; a slender waved subbasal dark line from costa to  $SM^2$ ; antemedian line blackish, thickened except at extremities, finely pale-edged distally, very slightly sinuous, more vertical than in *erectata*; cell mark grey,

lunular; median line grey, sinuous, excurved beyond cell-mark, incurved at fold; postmedian line black, produced to an acute angle outwards at  $R^1$ , then somewhat crenulate, *bent inwards at submedian fold*; a narrow paler band beyond the postmedian, faintly bisected from  $R^1$  to hind margin; a large black subapical dot as in *erectata*; apical dark mark minute and not strong; terminal line fine, crenulate, grey, not very conspicuous except in a black dot at fold.

*Hind wing* similar to that of *erectata*, but more weakly marked.

*Underside* pale grey tinged with yellow-brown, very feebly marked; cell-dots obsolete; postmedian indicated, at costa slightly pale-edged distally; a crenulate pale subterminal line indicated on hind wing.

Cameroons (*Watkins*).

33. *Tolnaodes dasynota calocraspeda*, subsp. n.

♂ ♀.—*Fore wing* in general less reddish than in *dasynota* from Colombia, Venezuela, and French Guiana, with darker clouding in distal area; fringe *above*, as well as beneath, white between the folds of cellules 4 and 5 and again before (and sometimes also behind)  $M^2$ .

*Hind wing* dark, in general with the subterminal markings less prominent.

Peru and Ecuador; the type and another ♂ from Santo Domingo, S.E. Peru, 6000 feet, November 1904 (*G. Ockenden*); ♀ ♀ from Rio Pastaza, E. Ecuador, 3500–4900 feet (*G. Palmer*), and Rio Tabaconas, N. Peru, 6000 feet (*A. E. & F. Pratt*).

Subfamily *EREBINÆ* (*Noctuinae*, Hmps.).

34. *Melapera roastis*, Hmps.

This interesting species, a genotype, was described (Ann. & Mag. Nat. Hist. (8) i. p. 488) from a single ♀ from Forêt d'Ambre, Madagascar. A ♂ in the Joicey collection (Fort Carnot, Tananarivo dist.) is smaller, 52 mm., the fore wing yellow, suffused with pink, becoming pink basally and posteriorly and with shadowy pale pink markings, namely, a roundish spot in cell, another at base of  $R^2$ – $M^1$ , a smaller one anterior to this, and a subterminal row of smaller inter-neural ones about 4 mm. from termen, that in cellule 6 slightly displaced distad; the hind wing with strong red hair in abdominal region.

The generic characters do not need amplification except



to add that the antenna is bipectinate to apex, the branches rather long, shortening suddenly at apical end, and that vein C of the hind wing does not anastomose with cell in the middle, but is connected with a bar as in the Aganaiidae, with which the genus seems to show some affinity.

Subfamily *HYBLÆINÆ*.

35. *Hyblæa joiceyi*, sp. n.

♂.—46 mm.

Head and palpus purple-fuscons, palpus beneath whitish proximally. Thorax chocolate-brown; beneath paler, variegated with whitish and yellowish anteriorly, with reddish posteriorly. Abdomen above fleshy greyish; beneath mostly red, with a dark central line. Fore leg with gold-yellow tuft on coxa, femur white, tibia above brown, tarsus blackish; middle and hind legs predominantly red.

*Fore wing* not very broad, costal margin not strongly arched (very slightly waved), termen almost straight and rather oblique from apex to M<sup>1</sup>, somewhat excised between M<sup>1</sup> and tornus; chocolate-brown, slightly variegated in the shadings, almost throughout with irregularly scattered dots and small spots of greenish white; faint indications of an elongate dark apical streak.

*Hind wing* scarlet-vermilion, unmarked; abdominal margin with tufts of very long yellowish hair; fringe yellowish, from apex nearly to R<sup>1</sup> proximally infuscated.

Fore wing beneath red-orange, becoming infuscated midway between cell and termen, darker at extreme margin; costal margin dotted with fuscous; hind margin pale; a rosy patch in submedian area; an elongate dark cell-mark. Hind wing beneath orange-red with coarse purple-fuscons speckling, which in distal area is condensed into an ill-defined cloud; between fold and abdominal margin clear red, as above.

Isle of Mioswar, Geelvink Bay, North Dutch New Guinea, September 1909 (C. & F. Pratt).

Near *ibidias*, Turn. (Proc. Linn. Soc. New South Wales, xxvii. p. 135), but larger, the wings slightly narrower; further distinguished by the pale-spotted fore wing and even brighter red, entirely unmarked hind wing.

36. *Hyblæa puera vitiensis*, subsp. n.

♂, 40 mm.; ♀, 36 mm.

Abdomen beneath wholly red.

*Fore wing* above with strong purple shades (but evidently variable, as in the other forms).

*Hind wing* above with the orange markings entirely bright red, at most with a few orange scales in middle of anterior margin of central band; beneath brighter red than in the other forms, scarcely irrorated and not clouded with purple-fuscous, not mixed with yellow between  $M^2$  and abdominal margin; basal area, on the other hand, gold-yellow.

Suva, Viti Levu (Woodford), type. New Hebrides.

Family Geometridæ.

Subfamily STERRHINÆ.

37. *Scopula hesycha*, sp. n.

♂.—27 mm.

Face black-brown. Vertex whitish, narrowly black-edged behind. Antennal joints scarcely projecting, ciliation scarcely longer than diameter of shaft. Collar ochreous. Thorax and abdomen concolorous with wings. Hind tarsus well under one-half the length of tibia. Wings shaped nearly as in *delitata*, Prout, the bend at  $R^3$  of hind wing slightly more noticeable.

*Fore wing* slightly more brownish than in *delitata*, the irroration being equally fine and close but slightly darker; markings as in *delitata*, but slightly less weak, the whitish subterminal line standing out rather more sharply, a little recalling that of *bifalsaria*, Prout; terminal dots even more minute than in *delitata*, only discernible in anterior part or wholly wanting; fringe not irrorated.

*Hind wing* with corresponding markings; terminal dots wanting.

*Fore wing* beneath with rather strong reddish-smoky suffusions in and beyond cell, leaving the posterior and distal areas pale, the costal edge narrowly ochreous; cell-dot present; median shade weak; postmedian line well developed; a fine terminal line. Hind wing beneath whiter; cell-dot minute, scarcely noticeable; postmedian line faint; terminal line obsolescent, except as interneural dots.

Chang Yang, Central China, June 1888 (A. E. Pratt), type in coll. Joicey; paratypes, June and July, in coll. Brit. Mus. Moupin, W. China, June 1890 (Kricheldorf), a rather larger, rather more brownish ♀, in coll. Joicey.

Nearest *delitata*, but with shorter hind tarsus and antennal ciliation.

38. *Scopula scialophia*, sp. n.

♂.—22 mm.

Closely like the less variegated forms of *fibulata*, Guen.,

from Ceylon and S. India. Antennal ciliation slightly longer. Hind leg formed nearly as in *cleoraria*, Walk., and its form (?) *effrenata*, Walk. (both wrongly sunk by Hampson under *fibulata*), i. e., with the tarsus relatively much shorter than in *fibulata*, less than one-half as long as the tibia. A large tuft of rather glossy, distally darkened hair at base of abdomen beneath. Fore wing with the irroration rather less black than in *fibulata*, median shade not very diffuse, postmedian line rather less sharply angulated at R<sup>1</sup>, terminal line not continuous, not running round apex.

Khasia Hills, type (*Nissary*); paratype in coll. British Museum.

Smaller than *cleoraria* and *effrenata*, antennal joints less projecting, the tuft at base of abdomen distinctive.

#### Family *Egeriidae*.

#### Subfamily *ÆGERINÆ*.

#### 39. *Homogyna spadicicorpus*, sp. n.

♂.—25 mm.

Face black in middle, white at sides. Palpus with first joint black; second joint above and beneath mostly white, the fringes of hair on both sides black; third joint mostly white. Postorbital rim white. Vertex light ochreous-brown. Thorax above glossy black, with slight blue reflections and with a narrow band of light blue in front; a large red shoulder-spot, in certain lights shot with violet. Abdomen above bright chestnut (in some lights with slight violet reflections), the segments narrowly ringed with black anteriorly, with whitish posteriorly; underside as far as the third sternite black with blue reflections, fourth sternite white, fifth to seventh white with anterior black border; anal tuft above blue-black, beneath orange-ochreous. Legs black with blue gloss, the fore coxa, hair-tufts, spurs, and narrow rings at ends of tarsal joints predominantly white.

Fore wing black, in some lights brown-black, in some lights with bluish or greenish gloss, especially along the margins.

Hind wing vitreous, the veins, cell-mark, costal and distal margins, and fringes concolorous with fore wing.

Source of Karungu River, N.E. Rhodesia, December 1916 (S. A. Barnes).

Nearest to *sanguicosta* and *albicincta*, Hampson.

XIV.—*Descriptions and Records of Bees.*—LXXXIV.

By T. D. A. COCKERELL, University of Colorado.

THE Indian bees recorded below were received from Mr. T. V. Ramakrishna Ayyar, Government Entomologist of Madras, and were collected by him, except when the contrary is stated.

*Crocisa smithii*, Dalla Torre.

Coorg, Sidhapur, Rockhill, 3500 ft., April 23-26.

This was described from "Bombay, Sumatra, Borneo." Bombay is herewith designated as the type-locality.

*Crocisa ramosella*, sp. n.

♀.—Length 10.5 mm.

The hair-spots white, not at all tinged with blue. Superficially appearing identical with *C. ramosa*, Lep., from France, but differing thus: flagellum longer, the middle joints longer than wide; posterior spots on mesothorax much larger; scutellum much more finely punctured, and much more deeply excised posteriorly, its margin W-like; transverse bands at sides of first two abdominal segments broader. In the flagellum this resembles the Arabian *C. fallibilis*, Kohl, but the scape is not longer than in *ramosa*, and *fallibilis* has the scutellum as in *ramosa*.

Chittoor, April 19-27, 1915.

*Crocisa albolateralis*, sp. n.

♂.—Length 12 mm.

Robust, with pure white markings. Very close to *C. ramosella*, but larger, with a tuft of white hair on the scutellum at the emargination (in addition to the white hair projecting from beneath the emargination, which is present in both); inner sides of scutellar lobes shallowly but very distinctly emarginate about the middle; patch of white hair on pleura considerably larger; hind tibiae with more white hair; transverse bands on first abdominal segment narrowing mesad, subacute, thus quite different from those on second, which are very obtuse, with the upper edge concave (in *ramosella* the bands are nearly the same on the two segments); second abdominal segment less closely punctured, and with the basal half greenish.

Kurnool District, Tippanur, Aug. 16, 1913.

*Crocisa reductula*, sp. n.

♀.—Length 11 mm.

With pure white markings. Also similar to *C. ramosella*, but more slender, and also differing thus: anterior mesothoracic spots a little broader than long (conspicuously longer than broad in *ramosella*); a very small spot instead of a stripe on each lateral margin of mesothorax; emargination of scutellum forming a much wider angle; first two abdominal segments with strong purple tints on basal half; transverse extension of marks at sides of first segment short and pointed; third and fourth segments with only spots placed some distance from the lateral margins, fifth with a pair of large round spots placed more laterally; last ventral segment conspicuously produced; white hair on outer side of hind tibiae confined to basal half.

Bababuddin Hills, Mysore, 4700 ft., June 1, 1915.

*Crocisa ramakrishnae*, sp. n.

♀.—Length about 12 mm.

With very pale blue markings, which are not shining. Median stripe of mesothorax long, extending to front margin; anterior lateral spots rather small, longer than broad; lateral margins with complete stripes, very narrow posteriorly; posterior spots of mesothorax pyriform, pointed mesad; scutellum without spots, shining, sparsely punctured, the hind margin W-like, a tuft of white hair beneath the emargination; mesopleura with a large hairless coarsely punctured space in middle; anterior wings fuliginous; tibiae and basitarsi with bluish-white hair on outer side, hardly going beyond middle on hind tibiae. Abdomen with very broadly interrupted blue bands, the basal band of first segment narrow, and rather narrowly interrupted; pygidial plate with a weak keel not reaching its base. In my table in 'Entomologist,' 1910, p. 217, this runs to *C. decora*, Smith, which has a broad basal band on first abdominal segment, and is otherwise quite distinct. It also fails to find a place in the tables of Friese and Bingham, and is unlike any described Indian species.

Type from Marudamalai, Coimbatore, S. India, 2000 ft., Aug. 18, 1912. Another is from Coorg Sanivarsandai, Hansey Estate, 4000 ft., April 29–30, 1913.

*Anthophora subinsularis* (Strand).

Bangalore, 3000 ft., May 8, 1913.

Strand described this as a variety of *A. insularis*, Smith,

because it seemed to differ somewhat from Bingham's description. It is apparently quite distinct from the true *insularis*, which was described from Sarawak. It is closely related to *A. vigilans*, Smith, having quite the same appearance.

*Xylocopa sigiriana* (Cockerell).

♀. Bababuddin Hills, Mysore, 4700 ft., June 1, 1915.

Described as a subspecies of *X. amethystina*, but evidently a distinct species.

*Xylocopa ignita*, Smith.

♀. Dodabetta, Nilgiris, 8000 ft., May 1-3, 1916.

Larger than the last, with longer second submarginal cell. This does not quite agree with Maidl's description, but I think it is Smith's *ignita*. Possibly two or more closely related species have been confused under this name.

*Hypanthidium salemense*, sp. n.

♂. (Type.)—Length about 11 mm., anterior wing 8.5.

Black, with cream-coloured markings, the pubescence very scanty, pure white; femora with a red stripe on upper side, and hind femora largely reddish behind; first abdominal segment with a short red stripe on each side basally; mandibles elongate; antennæ entirely black; front and vertex very densely punctured; mesothorax and scutellum very densely and strongly punctured; scutellum prominent, sharp-edged, rounded, emarginate in middle; tegulæ punctured, smooth in middle. Wings dilute fuliginous; second recurrent nervure going far beyond end of second submarginal cell; hair on inner side of tarsi orange; spurs red; no pulvilli; seventh abdominal segment very broadly rounded, with a keel down the middle, the hind margin might be called truncate; segments 3 to 6 with lateral teeth, that on 3 small. The pale markings are as follows: mandibles (except apex), clypeus (except narrow lower margin), rest of face except large black triangular area above clypeus, a stripe mesad of each antenna, an elongate mark below middle ocellus, a finger-like extension along each anterior orbit to level of middle ocellus, a broad band on upper part of each cheek, and two elongate spots on occiput, ends of tubercles, L-shaped marginal stripe on each side of mesothorax, axillæ, large mark on mesopleura, two crescentic marks on each tegula, broad stripe on under side of anterior and middle femora, long stripe on anterior and middle and

short (basal) one on hind tibiae, two large marks on each side of first six abdominal segments, on first oblong, on second and third long and transverse, on the others shorter, that on sixth square.

♀.—Length a little over 8 mm.

Ventral scopa pale yellowish; clypeus black, with a large light spot near each lower corner; sixth abdominal segment with only minute light dots.

Salem, S. India, Dec. 2-18, 1914.

By its characters, this falls in the American genus *Hypanthidium*, but it is a very distinct form. The end of the abdomen recalls that of *Anthidium pulchellum*, Klug.

*Dianthidium ramakrishnae*, sp. n.

♀.—Length about 6.5 mm.

Head, thorax, and abdomen black, with cream-coloured markings as follows: large spot on mandibles, clypeus, large triangular lateral face-marks (the inner part of each formed by a lateral spot on supraclypeal area), stripes on cheeks, reaching sides of occiput, band on mesothorax above each tegula (not reaching anterior corners of mesothorax), end of tubercles, spot on axillae, narrowly interrupted band on scutellum, spot at each side of first abdominal segment, very broadly interrupted band on second, less broadly interrupted band on third, one very narrowly interrupted on fourth, and that on fifth only emarginate anteriorly in middle, sixth segment with a transverse oblong patch. Head and thorax very densely and finely punctured; flagellum dark chestnut-red beneath; pubescence of head and thorax very scanty, white; tegulae large, closely punctured, with a pallid mark in front. Wings dusky; femora bright ferruginous; anterior tibiae black with a pale stripe on outer side, red on inner; middle tibiae similarly marked, but hind ones with only the apical part red on inner side; tarsi mainly dark, but the very broad hind basitarsi pale yellowish on outer side; hair on inner side of tarsi ferruginous; ventral scopa very pale yellowish. The hind tibiae are very robust.

Bababuddin Hills, Mysore, 4700 ft., June 1, 1915.

Related to *D. rasorium* (*Anthidium rasorium*, Smith), but without the abundant white pubescence, and differing in the details of coloration.

*Parevaspis carbonaria* (Smith).

Coimbatore District, Bailur Forests, Nov. 23-28; Chittoor, April 19-27.

*Ceratina canarensis*, sp. n.

♀.—Length 10 mm.

Black, with bright yellow markings on head and thorax as follows: very broad band down middle of clypeus, with a short truncate projection on each side at lower end; low and broadly triangular supraclypeal mark; very broad bands along inner orbits, extending across to borders of clypeus and supraclypeal area; two spots below ocelli; cheeks, except uppermost part adjacent to eye; border of prothorax, not reaching tubercles; tubercles; very broad vertical band on pleura; two lines on disc of mesothorax, and short broad lateral bands above tegulae; scutellum and axilla, except extreme base; line on postscutellum; and metathorax except basal area. Eyes dark olive-green; mandibles dark apically, otherwise pale yellow suffused with red; flagellum very obscure reddish beneath; mesothorax polished and impunctate on disc, but anteriorly dull and finely punctured; tegulae rufo-testaceous with a small yellow spot. Wings dusky, stigma and nervures piceous. Legs obscure reddish, anterior knees and tibiae yellow suffused with reddish. Abdomen with the first three segments dark reddish, the others black, the apical margin of fourth and fifth narrowly testaceous; first segment with a yellow discal patch, subquadrate with a posterior extension, on each side of this the surface is black, but the posterior margin is broadly rufous; second segment posteriorly with a broad, paler, somewhat yellowish band, interrupted in middle.

South Canara District, Nagody, 2500 ft., Sept. 19, 1913.

Related to *C. hieroglyphica*, Smith, but distinguished by the coloration of the abdomen and the very broad lateral yellow bands on face.

*Lithurgus australior*, sp. n.

♂.—Length 12 mm.

Similar to the male of *L. atratus*, Smith (Khasia Hills, Staden), but differing thus: face thickly covered with pure white hair, not mixed with black; a tuft of white hair



between ocelli; thorax anteriorly, and tubercles, with white hair, but hair of mesopleura black; tegulae smaller. Wings shorter, marginal cell less sharply acuminate, second submarginal cell much shorter; hind basitarsi curved but simple, not enlarged at end. Abdomen above very smooth and shining, not distinctly roughened or punctured; black hair at sides of fifth and sixth segments much shorter. In Friese's table it runs to *L. dentipes*, Smith, but the true *dentipes* is Australian, and has pale yellow hair on face and ferruginous nervures; the stigma and nervures are reddish fuscous in *L. australior*, and the disc of the thorax, except anteriorly, has black hair.

Coimbatore, S. India, Nov. 12, 1913.

The abdomen is distinctly narrower than in *L. atratus*.

*Cælixys (Liothyrapis) dormitans*, sp. n.

♂.—Length about 13 mm.; anterior wing 7.8 mm.

Black, including antennae, tegulae, legs, and spurs; pubescence pure white, abundant and dense on face, on the abdomen forming interrupted bands in the depressions, and marginal bands, evanescent or failing in middle; eyes dark brown, hairless; mesothorax and scutellum very densely and strongly punctured, except that in the middle the shining surface can be seen between the punctures (very narrowly and slightly on scutellum); scutellum convex, obtusely subangular posteriorly; axillar spines reduced to short obtuse tubercles. Wings dusky, but not strongly darkened; anterior coxae with sharp spines. Abdomen shining, well punctured, the punctures on second segment conspicuously larger than those on third; terminal segment with a long subbasal spine on each side; apex produced, deeply sulcate, with no median spine; lower apical spines sharp and divergent, upper apical divisions briefly bidentate or tridentate. Related to *C. apicata*, Smith, but the end of the abdomen is different. In *C. apicata* the second submarginal cell receives the first recurrent nervure some distance from its end; in *C. dormitans* the first recurrent meets the first transversocubital nervure. (The *C. apicata* compared is from F. Smith's collection.)

Coimbatore, S. India, May 25, 1913, sleeping on grass.

*Megachile (Eumegachile) triangulifrons*, sp. n.

♀.—Length 15 mm.

Agreeing in all respects with Smith's description of his

*M. cephalotes*, except that the abdomen is not at all metallic, and the ventral scopa, instead of being entirely white, is cream-colour, black on the last segment and the apex of the penultimate one. It also differs from *cephalotes* in the structure of the face, which is not described by Smith. The supraclypeal area presents a large pit or hollow, surrounded by a triangular rim, which is variably but not coarsely punctured; the clypeus is smooth and deeply receding, with a strong dentiform median tubercle near the upper end.

Hindupur, Anantapur District, April 9-14, 1915.

*M. cephalotes* was described from Northern India; Bingham reported it from Dehra Dun and Ahmedabad.

*Megachile (Eumegachile) ramakrishnæ*, sp. n.

♀. (Type).—Like *M. triangulifrons*, but smaller, length not quite 13 mm.

Ventral scopa black only at extreme apex, even the base of last segment with pale hair; supraclypeal basin less distinct, with large coarse punctures about its margin, the area between it and the clypeus (practically obsolete in *triangulifrons*) quite wide, and coarsely punctured, with a median smooth tubercle; clypeus short, with the median tubercle not nearly so large as in *triangulifrons*; mandibles with the second tooth, prominent in *triangulifrons*, subobsolete.

♂.—Length about 8.5 mm.

Hair of face dense and pure white, but the upper part of the clypeus is closely and minutely punctured, and bare; anterior coxæ with short but well-developed spines; anterior tibiae and basitarsi polished and dark brown on inner side, the basitarsi distinctly hollowed and a little produced at end; end of abdomen bituberculate, and at the sides subapically are long black hairs.

Coimbatore, Nov. 1913.

There are three other species in the Indian fauna which should be compared with the above two. *M. arcuata*, Ckll., from Punjab, is similarly formed, and the distinct tubercle on the inner border of the mandibles is represented in *triangulifera*. In the species just described the hair on the dorsum of thorax is scanty and wholly white, but the thorax of *arcuata* has sparse black hairs above. *M. arcuata* also lacks the tubercle on clypeus.

*M. lissopoda*, Cam., from Bombay, has the hair of pleura soot-coloured; in our insects it is thin and white. *M. lisso-*

*Ann. & Mag. N. Hist. Ser. 9. Vol. iii.*

*poda* has not the long curved mandibles of *M. cephalotes* and our insects, and the structure of the face differs.

*M. stirostoma*, Cam., from Dehra Dun, differs by the essentially hyaline wings, those of our insects being strongly smoky, except at base. The structure of the face and front also differ; thus there is no median tubercle on the clypeus. There is black hair on the apical part of scutellum and on postscutellum, but the hair of these parts is all white in our species.

*Megachile aureobasis*, sp. n.

♂.—Length about 10 mm.

Black, the wings fuliginous except the base, which is strongly orange. Very close in all respects to *M. umbripennis*, Smith, from Nepal, but differing thus: hair of thorax above thin and short, so that the thorax appears dark, except around the margins, where the fox-red hair is conspicuous; abdomen with entire hair-bands, that at apex of second segment red except at sides; front above antennae without a distinct band of fulvous hair. The end of the abdomen is faintly emarginate.

Madras, Sept. 3, 1907 (*T. S. A.*).

Perhaps only a local race of *M. umbripennis*, but I have seen no intermediates.

*Megachile anthracina*, Smith.

♂. Coimbatore, Nov. 1913.

XV.—*Note on Chaudhuria, a Teleostean Fish of the Order Opisthomi.* By C. TATE REGAN, M.A., F.R.S.

(Published by permission of the Trustees of the British Museum.)

IN a recent memoir on the fishes of the Inlé Lake (Southern Shan States) Dr. Annandale\* has described a new genus and species to which he has given the name *Chaudhuria caudata*, and has made it the type of a new family—Chaudhuriidae—of the order Apodes. On reading Dr. Annandale's description and studying his figures I came to the conclusion that this little fish was not a member of the Apodes (*cf.* Regan †), but

\* Annandale, "Fish and Fisheries of the Inlé Lake," *Rec. Ind. Mus.* xiv. 1918, pp. 33-64, 7 pls.

† Regan, "The Osteology and Classification of the Teleostean Fishes of the Order Apodes," *Ann. & Mag. Nat. Hist.* (8) x. 1912, pp. 377-387.

belonged to a very different\* group—the Opisthomi (cf. Regan \*)—and I think that *Chaudhuria* may be characterized simply as a *Mastacembelus* without spines and without rostral appendage. In other characters—form, scaling, structure and position of fins, nostrils, mouth, lips, dentition, gill-openings, branchiostegal rays, etc.—there seems to be no difference between the two genera. The few details given of the skeleton of the head of *Chaudhuria* are applicable to *Mastacembelus*, allowance being made for the præmaxillary, with the attached maxillary, being described by Dr. Annandale as the maxillary only. The peculiarities of the vertebræ, to which Dr. Annandale has called attention, are found in *Mastacembelus* also.

Dr. Annandale informs me that he has no time at present to make a further investigation in order to test the validity of my opinion as to the systematic position of *Chaudhuria*, and, as no specimens are available for examination in this country, it seems worth while to publish this note.

---

XVI.—*On small Mammals collected by Sr. E. Budin in North-western Patagonia.* By OLDFIELD THOMAS.

(Published by permission of the Trustees of the British Museum.)

SEÑOR E. BUDIN, the collector of the Chumbicha mammals described in the last number of the 'Annals' †, helped by the kindness of Dr. O'Connor, Mr. Charles Lockwood, and the authorities of the Argentine Southern Land Company of Buenos Ayres, has also been enabled to make a collecting-trip to Lake Nahuel Huapi, in the mountainous part of north-western Patagonia, and to two other places in the same region, Pilcañeu on the Upper Rio Negro (41° S., 1° W.) and Maiten on the Upper Chubut (42° S., 71° W.).

At each of these places he made a collection of small mammals, mostly Muridæ and Iuco-tucos, and all prove to be of the greatest interest.

Of the twenty forms obtained I have found it necessary to describe nine as new, while he has also collected an animal—the *Reithrodon longicaudatus* of Philippi—which proves to represent a very distinct new genus, quite unlike anything previously known to me.

\* Regan, "The Osteology of the Teleostean Fishes of the Order Opisthomi," Ann. & Mag. Nat. Hist. (8) ix. 1912, pp. 217-219.

† *Sagra*, p. 115.

In addition, his material of the short-tailed mole-like burrowing rats has greatly advanced our knowledge of these interesting and little-known animals, which now prove to belong to two distinct genera, of which, again, one needs description as new.

Our thanks are due to the kind friends who gave Sr. Budin help and hospitality, and to Sr. Budin himself for the keen and successful manner in which he has carried out the mission entrusted to him.

1. *Lasius borealis*, Müll.

♀. 60, 66. Beatriz, Nahuel Huapi. 800 m.

2. *Oryzomys magellanicus mizurus*, Thos.

♂. 195, 197, 200, 212, 215; ♀. 175, 191, 192, 196, 198, 199, 220. Maiten, Upper Chubut R. 700 m.

(?) ♂. 58, 102, 105, 113, 118, 119. Beatriz, Nahuel Huapi. 800 m.

"The most common species at Maiten. Called 'Coludo,'—E. B.

3. *Reithrodon cuniculoides*, Waterh.

♀. 173. Maiten. 700 m.

Being a single specimen only I am not able to satisfy myself as to what subspecies of *R. cuniculoides* this should be referred to. All the forms that have been named in this difficult group are distinguished by somewhat intangible and more or less variable characters.

4. *Phyllotis xanthopygus*, Waterh.

♂. 128, 129, 132, 133, 134, 136, 147, 148, 151, 153; ♀. 130, 131, 137, 138, 140, 146, 149. Pilcañen. 1400 m.

In these specimens the buffy wash on the under surface is far more marked than would be supposed from either Waterhouse's or Allen's description. But the type—no. 55.12.24.185—shows clearly the same general buffy tone to the hairs of the belly, none of them being really tipped with white.

"Caught among the cactus-plants."—E. B.

5. *Irenomys longicaudatus*, Phil.

♂ (imm.). 73. Beatriz, Nahuel Huapi. 800 m.

This most interesting specimen represents the re-discovery of Philippi's *Reithrodon longicaudatus*, whose identity has long been a mystery. It proves, as might be expected, to belong to an undescribed genus, which may be called

IRENOMYS\*, gen. nov.

General facies as in *Oryzomys*. Upper incisors grooved. Molars hypsodont, laminate, the laminae lozenge-shaped in section.

Genotype. *I. longicaudatus* (*Reithrodon longicaudatus*, Phil.†).

The skull, judging by an immature example, is on the whole not unlike that of *Phyllotis*, and presents no very special peculiarities. The interparietal is of full size. The zygomatic plate is of average breadth, but little projected forward, not undercut. Palatine foramina long, penetrating between the molars. The internal pterygoids, however, are unusually thickened, flattened, and turned outwards above, though this may be partly due to immaturity. Bullae of medium size.

Upper incisors with a sharply defined groove.

Molars very peculiar, hypsodont, laminate, with three laminae to  $m^1$ , two to  $m^2$  and  $m^3$ , and the same numbers in the three molars below. The laminae of the upper teeth are very much as if the re-entrant angles of each side in the teeth of *Phyllotis* penetrated further into the teeth, so as to cut connection between the dentine spaces of each lamina, while still leaving the laminae lozenge-shaped and just touching each other at these median points. As a result, the shape in section of the laminae in a young animal is almost precisely similar to that in the African elephant, as viewed vertically, though of course the spaces between the lamina are not filled up with cement. Such teeth as these would in old age wear down to a sufficient approximation to Philippi's figure to render it certain that the two animals are congeneric.

This new genus is undoubtedly quite distinct from any previously recognized, and it is not easy to be certain as to its relationship to others. Probably it is most nearly allied to *Phyllotis*, of which it may be looked upon as a relative with grooved incisors and simplified molars. But, in any case, the difference is very considerable, and the study of adult specimens may cause some modification of this opinion.

Sr. Budin noticed that the single specimen was distinct from the ordinary *Oryzomys*, to which it has so marked a resemblance, and did all in his power to get further examples, but without success.

"Caught among the roots of fallen trees, like all the other species of the Beatrix peninsula."—E. B.

\* So named as a memento that its recognition coincided with the arrival of a glorious peace.

† An. Mus. Nat. Chile, pt. 14, "Muridae of Chile," p. 64 (1900).

6. *Euneomys micropus alsus*, subsp. n.

♂. 171, 177, 183, 188, 201, 202. Maiten, W. Chubut.  
700 m.

Similar in all essentials to true *E. micropus*, as represented by series from Koslowsky (lat. 46° S.) and Rio Chico, but almost or quite without the strong buffy suffusion on the fur, the general tone being more slaty greyish. Under surface also clearer greyish, with but little buffy wash.

Dimensions of the type (measured in the flesh):—

Head and body 123 mm.; tail 117; hind foot 27; ear 18.

Skull: greatest length 31·3; condylo-incisive length 28·7; zygomatic breadth 18; palatal foramina 7·8; upper molar series 5·7.

*Hab.* as above.

*Type.* Adult male. B.M. no. 18.12.2.13. Original number 177. Collected 23rd April, 1918.

The series with which these specimens have been compared includes specimens killed in February, June, August, and December, so that the difference in the general colour is evidently not a seasonal one.

I may note here that my reference of *Mus (Phyllotis) xanthopygus*, Waterhouse, to the genus *Euneomys*—a reference probably induced by the noticeable resemblance it bears to *E. micropus*—now proves to be erroneous, as it is certainly a *Phyllotis*, the most southern member of that widely distributed genus. Its narrow incisors readily distinguish it from *E. micropus*, with which it is found.

The local modification in colour shown by this subspecies is exactly as in the *Abrothrix suffusus* of the same region.

7. *Eligmodontia morgani*, All.

♂. 142, 159, 165, 166; ♀. 125, 154, 157, 160, 161, 163, 164. Pilcañu, Upper Rio Negro.

“Common. Lives in holes at the foot of the bushes.”—*E. B.*

8. *Abrothrix suffusus modestior*, subsp. n.

♂. 176, 182, 193, 203, 204, 211, 214, 217; ♀. 172. Maiten.

Like typical *suffusus* of the Koslowsky region, but rather darker and more slaty grey, the reddish or buffy of the back reduced both in extent and brightness. Face almost without buffy. Sides quite without buffy, so that there is a broad

greyish slaty band, dividing the subdued buffy area of the back from the greyish white of the belly, while in *suffusus* the same lateral region is buffy brownish in continuation with the back. Ears with a fairly well-marked greyish-white spot at their notch and on the base of the metentote. Under surface clear greyish white, quite as in *suffusus*. Feet white. Tail definitely bicolor, blackish above, whitish below, as in *suffusus*.

Skull as in *suffusus*.

Dimensions of the type:—

Head and body 97 mm.; tail 68; hind foot 23·5; ear 17.

Skull: greatest length 29; condylo-incisive length 25·8; zygomatic breadth 14·2; interorbital breadth 4·8; breadth of brain-case 13; palatal foramina 6·6; upper molar series 4·1.

*Hab.* as above.

*Type.* Adult male. B.M. no. 18. 12. 2. 22. Original number 204. Collected 2nd May, 1918.

This form, by its more subdued colour as compared with true *suffusus*, forms a step towards the following subspecies.

#### 9. *Abrothrix suffusus mærens*, subsp. n.

♂. 62, 70, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 89, 90, 93, 97, 99, 101, 107, 112, 115, 116; ♀. 65, 67, 68, 69, 74, 86, 104, 106, 110, 117. Beatriz, Nahuel Huapi. 800 m.

Much darker than true *suffusus* or the previous subspecies, the back dark brown almost without buffy, and the belly—which is practically white in *suffusus* and *modestior*—"deep dull grey," very much as in the Chilean *longipilis*. Ears almost without greyish patches at their bases. Hands and feet grey, near "pale neutral grey." Tail averaging a little shorter than in the other forms, and less markedly bicolor, blackish above, greyish below.

Skull as in *suffusus*.

Dimensions of the type:—

Head and body 110 mm.; tail 72; hind foot 22·5; ear 16.

Skull: greatest length 29; condylo-incisive length 26; zygomatic breadth 14; interorbital breadth 5; breadth of brain-case 12·4; palatal foramina 6·6; upper molar series 4·2.

*Hab.* as above.

*Type.* Old female. B.M. no. 19. 1. 1. 22. Original number 104. Collected 25th February, 1918.

This form of *Abrothrix*, from the lake-region of Nahuel Huapi, is, so far as colour is concerned, much more distinct from *A. suffusus* than is that of Maiten, and I have hesitated



as to whether it ought not to be distinguished specifically. Besides its generally dark colour, its greyish belly, grey feet, and scarcely bicolor tail all help to distinguish it. But its skull is so precisely like that of *rufus* and *modestior* that it evidently represents them in a more saturate area, and for the present, therefore, I retain it in connection with them. Perhaps, also, hereafter these forms will link up with the *A. hirtus* of San Rafael, Mendoza, still further to the northward.

To the list of the species belonging to *Abrothrix*, besides those mentioned in my paper on the grouping of the Akodont Muridæ\*, there should be added *Mus brachyotis*, Waterh., from the Chonos Archipelago.

All these forms of *Abrothrix* from the eastern slope of the Andes are readily distinguishable from *A. longipilis* of Chili by their far smaller skull.

"Trapped among the roots of fallen trees."—E. B.

10. *Akodon beatus*, sp. n.

♂. 61, 85, 87, 91, 100, 103, 108, 109; ♀. 59, 63.  
Beatriz, Nahuel Huapi. 800 m.

A rather large species of the *arenicola* group.

Size decidedly greater than in *arenicola* of Uruguay and Buenos Ayres, the hind foot averaging  $1\frac{1}{2}$  or 2 mm. longer. Fur close and woolly. General colour above dark olivaceous, under surface greyish white (near "light neutral grey"), the hairs slaty at base, white or whitish terminally, practically without the drabby or buffy wash generally found in *arenicola*; as a consequence, the upper and under surfaces are more contrasted with each other than in the common species. Ears coloured like head. Hands silvery white, a little darkening on the metacarpus. Feet brownish, the digits lighter. Tail as usual longer than in the *xanthorhynchus-canescens* group, rather prominently bicolor, blackish above, darkening terminally, whitish below.

Skull larger than that of *arenicola*, with large rounded brain-case and proportionally narrow interorbital region. Palatal foramina not extending so far back, their hinder edge hardly reaching the level of the middle of the second lamina of *m*<sup>1</sup>.

Incisors of about normal set, the angle 69° in the type. Notch at front end of *m*<sup>1</sup> not perceptible in any specimen, the youngest being, perhaps, three-fourths grown.

\* Ann. & Mag. Nat. Hist. (8) xviii. p. 340 (1916).

Dimensions of the type :—

Head and body 87 mm. ; tail 79 ; hind foot 22 ; ear 15.

Skull : greatest length 25·7 ; condylo-incisive length 23 ; zygomatic breadth 12·6 ; nasals 9·8 ; interorbital breadth 4·1 ; breadth of brain-case 12 ; palatilar length 10 ; palatal foramina 6 ; post-foraminal palate 3·2 ; upper molar series 3·7.

*Hab.* as above.

*Type.* Young adult male. B.M. no. 19. 1. 1. 34. Original number 108. Collected 26th February, 1918.

This appears to be the most southern of the widely spread *olivaceus-arenicola* group, which ranges from here northwards to Ecuador, and the members of which are the most common field-mice in almost every locality, taking the place in nature of our common voles. The other species obtained by Sr. Budin are of the more southern *xanthorhinus-canescens* group, distinguished among other things by the much shorter tail.

[*Akodon iniscatus*, sp. n.

Size and proportions as in *A. xanthorhinus*, but skull more bowed and thickly built, with shorter muzzle. First molar with a deep and distinct anterior notch, which only wears off in old age. A white patch on the chin.

Colour of typical race coarsely lined brown, near Ridgway's "buffy brown."

Dimensions of the type :—

Head and body 92 mm. ; tail 53 ; hind foot 19 ; ear 11.

Skull : greatest length 23·7 ; condylo-incisive length 21·7 ; zygomatic breadth 12·4 ; interorbital breadth 4 ; breadth of brain-case 11 ; palatal foramina 5·4 ; upper molar series 3·5.

*Hab.* Southern Buenos Ayres Province southwards into Patagonia. Type from the Valle de Lago Blanco, Koslowsky region, Patagonia, 46° S. Other specimens from Peru Station, N.W. of Bahía Blanca, Chubut, and Port Desire, besides the Budin examples referred to below.

*Type.* Adult female. B.M. no. 3. 7. 9. 64. Original number XXX. Collected 26th April, 1900, by J. Koslowsky. Ten specimens examined.

Our knowledge of the small *Akodons* of Patagonia has been in a very confused condition, though an improvement was made by Dr. Allen, who corrected certain mistakes that had been made in the labelling of the Darwin specimens, on which their nomenclature hangs. He rightly fixed on B.M. no. 55. 12. 24. 157 as the primary type of *A. canescens*, Waterh., and 55. 12. 24. 156 of *A. xanthorhinus*, Waterh.,

these specimens therefore, whatever other co-types were mixed up with them, being able to be taken as lectotypes of their respective names.

Now over most of the area concerned we seem to have two quite distinct forms of *Akodon*—A, with a short, normal-shaped, rather bowed skull, on whose  $m^1$  a very distinct and fairly persistent anterior median notch is present, an animal externally lined greyish brown, with a contrasted white chin-spot, and B, with a flattened long-nosed skull, the  $m^1$  practically without a notch, this only being perceptible in an aborted form in specimens with quite unworn teeth. Externally this animal is greyish or yellowish, with the feet more distinctly yellow, and the chin-spot not contrasted.

Returning to the type-specimens, it is quite clear, as shown by their skulls and teeth, that both 55. 12. 24. 156 and 157 belong to B, and that therefore A is without a name. Young and supplementary specimens obtained by Darwin on the Rio Negro and at Port Desire are referable to A, but these do not affect the determinations, and I propose to give to the latter form the name of *A. iniscatus*. A local form of it, obtained by Sr. Budin, I now describe.]

11. *Akodon iniscatus collinus*, subsp. n.

♂. 205, 208, 209, 210; ♀. 206, 207, 218. Maiten, W. Chubut. 700 m.

A more blackish race of *A. iniscatus*. A full description is given here instead of to the typical *iniscatus*, as quite fresh specimens are available of it, while those of that animal are less perfect.

Size small, about as in *xanthorhinus* and *canescens*, the tail short as in those southern species, not as in the *arenicola* group. General colour above dark grizzled olivaceous brown, (more greyish olivaceous and less brown than Ridgway's "olive-brown"), the hairs ticked with black and dull buffy; sides rather more buffy. Under surface soiled greyish buffy, the hairs dark slaty at base, their ends drabby or buffy—a patch in the inguinal region more definitely buffy. Chin, or rather interramia, with a conspicuous patch of wholly white hairs, contrasting markedly with the general dark colour. Ears short, their proecotote blackish, their metentote buffy. Hands and feet brownish white. Tail short, well haired, strongly bicolor, black along the top, whitish or buffy whitish on sides and below.

Skull rather bowed above, its surface smooth and unridged. Interorbital edges square, not ridged. Palatal foramina long,

reaching to the level of the second internal re-entrant notch of  $m^1$ .

Incisors about normal, their angle in the type  $72^\circ$ . Molars larger than in *xanthorhinus*;  $m^1$  with an unusually well-marked anterior median notch.

Dimensions of the type:—

Head and body 85 mm.; tail 56; hind foot 18; ear 12.

Skull: greatest length 24.5; condylo-incisive length 22; zygomatic breadth 12.6; nasals 9; interorbital breadth 4; breadth of brain-case 11.3; palatilar length 10; palatal foramina 5.8; postforaminal palate 3.6; upper molar series 4.0.

*Hab.* as above.

*Type.* Young adult female. B.M. no. 18.12.2.31. Original number 206. Collected 4th May, 1918.

"Caught among furze-bushes ('retamos')."—*E. B.*

#### 12. *Akodon canescens*, Waterh.

♂. 124, 127, 135, 145, 156, 158, 168, 169, 170; ♀. 121, 122, 141, 143, 167. Pilcañen, Upper Rio Negro. 1400 m. ♀. 216, 221. Maiten, W. Chubut. 700 m.

Although I provisionally use *canescens* for these greyish mice of the "B" group—since they correspond with the type of that name,—I strongly suspect that they are merely the grey seasonal phase of the yellowish *xanthorhinus*, the latter name having priority. But, though not inconsiderable, our material does not suffice to settle the question with certainty, and until such certainty is arrived at it is better not to assume so great a seasonal change as the absolute identification of *canescens* with *xanthorhinus* involves. A somewhat similar change is recorded by Dr. Allen, though his remarks are difficult to utilize fully, owing to a doubt as to how far specimens referable to *A. iniscatus* are included in what he calls *canescens*.

#### 13. *Chelemys vestitus*, Thos.

♀. 72. Beatriz, Nahuel Huapi.

This single specimen is young, and therefore does not furnish any information as to the relationship of *Ch. vestitus* to the more northern *Ch. macronyx* of San Rafael, Mendoza.

#### 14. *Geoxus* (gen. nov.) *valdivianus*, Phil.

♂. 92, 94, 98, 114; ♀. 88, 94, 95, 96. Beatriz, Nahuel Huapi. 800 m.

These specimens agree sufficiently closely with Philippi's figure and description of *Oxymycterus valdivianus* to render it fairly certain on geographical grounds that they should be referred to that animal. The question of its generic name is dealt with below.

"Live among the roots of fallen trees. Make burrows in the earth like tuco-tucos."—*E. B.*

#### 15. *Geoxus fossor*, sp. n.

♂. 178, 194. Maiten, W. Chubut. 700 m.

"Found under bushes ('retamos'), where they make holes with small hillocks over them, just like tuco-tucos. The similar mice from Nahuel Huapi do not make such hillocks."—*E. B.*

The six long-clawed Murines placed under these two headings have enabled me to make a fresh examination of the relationship they bear to my *Notiomys edwardsi*, to the genus *Oxymycterus*, and to the far southern species that have been referred to the latter.

I have to confess that Dr. Allen's assertion that his *Oxymycterus microtis* (to which these specimens are closely allied) had nothing to do with *Notiomys* proves to be entirely correct, my supposition to the contrary being wrong. Thanks to the kindness of Prof. Trouessart, I have been privileged to re-examine the type-skull of *Notiomys edwardsi*, and so am able to base my opinion on a firm foundation.

Of pertinent specimens we had previously only the two examples, adult and young, from Koslowsky mentioned in 1903\*, which, without sufficient reason, I assumed to be both of the same species. The young one (whose skull was crushed) being certainly *Notiomys*, and the other closely agreeing with "*Oxymycterus*" *microtis*, Allen, the generic identity of the two seemed to follow.

But study of the present valuable accession shows that the two Koslowsky animals are really different—the young one being *Notiomys edwardsi*, Thos., and the adult the species described by Dr. Allen.

On comparing now the good skulls of the mole-like animals related to "*Oxymycterus*" *microtis* in Sr. Budin's collection with the type-skull of *Notiomys*, I can confirm all that Dr. Allen† has said as to their essential distinctness. In the former the skull is long and narrow, with long muzzle, smooth

\* Ann. & Mag. Nat. Hist. (7) xii. p. 243 (1903).

† Mamm. S. Pat. pp. 81-85, illustrated by figures of skulls, pl. ix. (1905).

brain-case, and rounded interorbital region. In *Notiomys*, on the other hand, the skull is short and broad, with short conical muzzle, very broad and square-edged interorbital region, and strongly built brain-case. Both have equally the remarkably small molars, by which they may be distinguished from any other known forms.

Nearly related to Allen's *Oxymycterus microtis* are two earlier-described species—*Hesperomys* (*Acodon*) *michaelseni*, Matschie, and *Oxymycterus valdivianus*, Philippi—and my present material includes specimens referable to the latter, as well as the 1903 example of *microtis*.

But I cannot agree that these forms should be put actually into *Oxymycterus*, and now propose to make of them a new genus, which may be described as follows :—

#### GEOMYS, gen. nov.

Allied to *Oxymycterus*, but form more highly modified for burrowing, with velvety fur and very short tail.

Skull with no trace of squared edges to the interorbital space. Zygomatic plate narrow, more vertical than in *Oxymycterus*, its front edge scarcely projecting.

Incisors more slender and molars proportionally very much smaller than in the allied genus. The latter character also present in *Notiomys*.

Genotype, *Notomys fossor*, sp. n. (This selection is made to avoid any complications due to wrong identification of the other forms known—though I have really no doubt about any of them.)

Other species : *michaelseni*, Matsch., *valdivianus*, Phil., and *microtis*, All.

The excellent description and figures given by Dr. Allen of *N. microtis* will readily show the characters of this new genus. Matschie has also given figures of *N. michaelseni*.

With regard to the species *N. fossor*, it may be defined as follows :—

Essential characters as in *N. microtis*, but the fur even more thick and velvety and the general colour dark smoky greyish ("deep mouse-grey"), with none or scarcely any of the yellowish or drabby ticking which is described by Allen and is markedly present in our Koslowsky specimen of *microtis*. Under surface rather lighter grey, with a slight drabby suffusion ; the hairs all broadly slaty at base, grey terminally, those on the chin alone greyish white to their bases.

Skull, as in *N. microtis*, with the palatal foramina only

just reaching the level of the front edge of  $m^1$ , while in *N. valdivianus* they extend to the level of the back of the first lamina of that tooth.

Dimensions of the type (measured in the flesh):—

Head and body 104 mm.; tail 44; hind foot 20; ear 12.

Skull: greatest length 28; condylo-incisive length 25.5; zygomatic breadth 13.7; nasals 10; interorbital breadth 5.2; breadth of brain-case 12.8; palatilar length 11.4; palatal foramina 6; postforaminal palate 4.1; upper molar series 3.5.

*Hab.* as above.

*Type.* Old male. B.M. no. 18. 12. 2. 37. Original number 194. Collected 30th April, 1918.

This series of the long-clawed mole-like Marines of the south is perhaps the most interesting part of Sr. Budin's collection, and forms a very valuable accession to the National Museum.

#### 16. *Ctenomys haigi*, sp. n.

♂. 179, 180, 181, 184, 189; ♀. 174, 185, 186, 187, 190. Maiten, W. Chubut. 700 m.

Allied to *C. colburni*, All., but smaller, with smaller bullæ.

Size medium. Fur soft, fine and silky, hairs of back about 11–12 mm. in length. General colour of upper surface finely ticked greyish brown, near "drab," without median darker marking on rump or crown, the top of the nose only dark brown. Sides clearer grey, and the lower flanks rather abruptly and prominently buffy ("light buff") in continuation with the buffy wash on the hairs of the under surface. Forearms also prominently pale buffy both externally and internally; hind feet dull whitish. Tail grey on sides, blackish above and terminally below, but this, as usual, is variable in extent.

Skull, as compared with that of *C. colburni* as figured by Allen\*, similar in shape, but smaller and with decidedly smaller bullæ, which do not project backwards beyond the level of the supraoccipital. Interparietal quite united with parietals in all the specimens, the line of junction generally marked by some discoloration. Bullæ of average size, markedly less swollen than those figured in the male *C. colburni*.

Dimensions of the type:—

Head and body 165 mm.; tail 70; hind foot 28.

Skull: greatest length in middle line 40.2; condylo-incisive length 38.7; zygomatic breadth 23.5; nasals 11.7;

\* Mamm. S. Pat. pl. viii. fig. 4.

interorbital breadth 7·1; least breadth across brain-case 16·5; meatal breadth 24·5; breadth across bullæ exclusive of meatus 22·5; palatilar length 16·5; horizontal diagonal length of bullæ 15·2; upper molar series, crowns 8·2, alveoli 9.

*Hab.* as above.

*Type.* Adult male. B.M. no. 18.12.2.39. Original number 180. Collected 24th April, 1918.

This species differs from *C. colburni* by its smaller size, less swollen bullæ, and less fulvous coloration.

Named in honour of General Sir Douglas Haig, Commander-in-Chief of the British armies.

17. *Ctenomys haigi lentulus*, subsp. n.

♂. 144, 155, 162; ♀. 152. Pilcañen, Upper Rio Negro. 1400 m.

Like true *haigi*, but the general colour browner and less grey-ticked, the dull patch on the muzzle more inclined to extend up on to the crown, the lower flanks more greyish brown, without the strongly marked buffy wash contrasting with the dorsal colour which is found in every specimen of *haigi*, and with the forearms also brownish, not buffy.

Dimensions of the type:—

Head and body 155 mm.; tail 70; hind foot 30; ear 6.

Skull: greatest median length 40; condylo-incisive length 38·5; zygomatic breadth 23·5; nasals 15; interorbital breadth 7·7; meatal breadth 25; breadth across bullæ (exclusive of meatus) 25; upper molar series, crowns 8, alveoli 8·8.

*Hab.* as above.

*Type.* Adult male. B.M. no. 18.12.1.23. Original number 162. Collected 4th April, 1918.

Most readily distinguished from the Maiten tuco-tuco by the absence of the light buffy wash on flanks and forearms.

18. *Galea negrensis*, sp. n.

♀. 139. Pilcañen, Upper Rio Negro. 1400 m. Collected 23rd March, 1918. B.M. no. 18.12.1.25. *Type.*

General external characters of *G. boliviensis*. Colour of back mixed blackish and buffy. Under surface whitish, the belly-hairs broadly slaty basally, but with completely white areas in the axillary and inguinal regions. Eyelids whitish as usual, and a buffy-whitish patch at the base of the proctode of the ear. Fore limbs with their whole inner and upper surfaces buffy white; hands more strongly buffy. Inner side of hind limbs also whitish; the feet dull buffy.



212 *On small Mammals from North-western Patagonia.*

Skull, as compared with specimens from Cordova taken provisionally to represent *G. leucoblephara*, more heavily built, though with narrower interorbital region. Palatal foramina short. Mesopterygoid fossa broadly rounded anteriorly, the palatine level with the main inner re-entrant angle on  $m^2$ . In the Cordova specimens the fossa is continued further forward, and is narrowly pointed anteriorly. Bulke comparatively small, scarcely larger than in the otherwise much smaller *G. b. littoralis*.

Dimensions of the type:—

Head and body 215 mm.; hind foot 38; ear 24.

Skull: greatest length 55; condylo-incisive length 48.5; zygomatic breadth 32; nasals 20; interorbital breadth 9.5; palatilar length 25; palatal foramina 4.2; greatest horizontal diameter of bulla 14; upper molar series 12.

*Hab. and type* as above.

The present is the furthest southern record for the genus *Galea*, the next northwards being that of *G. boliviensis littoralis* from Bahia Blanca. The present animal is larger than *littoralis*, and its more widely open choanæ distinguish it from *leucoblephara*. It has smaller bullæ than the still more northern forms of Bolivia.

19. *Caviella australis*, Geoff. & d'Orb.

♀. 126, 143. Pilcañeu. 1400 m.

"Caught among burrows out on the fields."—E. B.

20. *Dromiciops australis*, Phil.

♂. 71; ♀. 111. Beatriz, Nahuel Huapi. 800 m.

The type-locality of Philippi's *Didelphys australis* appears to have been in the neighbourhood of Union, Valdivia, some 150 kilometres north-west of Nahuel Huapi, on the Chilean side of the Cordilleras. But, as already mentioned, the mountains in this region do not form an unbroken barrier, and Nahuel Huapi itself makes a gap in them, so that the identity of St. Badin's specimens with Philippi's species is quite natural.

Of this genus the Museum previously possessed the type of *Dromiciops gliroides* from Chiloe and an individual from Temuco presented in 1908 by Mr. R. M. Middleton.

"I was much pleased to obtain this striking little animal, which seems to be very rare. It was, like other things, caught among the roots of fallen trees."—E. B.

A most acceptable addition to the Museum collections.

XVII.—Two new Argentine Species of Akodon.  
By OLDFIELD THOMAS.

(Published by permission of the Trustees of the British Museum.)

DURING the working out of Sr. Budin's Patagonian collection the two following species of *Akodon* have proved to need description:—

*Akodon neocenus*, sp. n.

A shaggy grey species allied to *A. varius* of Bolivia.

Size and general appearance very much as in *A. varius*, with the same loose and rather shaggy fur, which is, however, rather longer and thicker; hairs of back about 13–14 mm. in length, intermixed with longer bristle-hairs attaining 17 mm. General colour greyer than in *varius*, with less buffy, though the essential mixture of grey and buffy, varied by the dark tips to the hairs, is similar. Hands and feet whitish. Tail rather long, well haired, blackish above, whitish below.

Skull with the nasals narrower and more tapering posteriorly than in *A. varius*. Supraorbital broad with squared edges. Postero-external corners of brain-case developed into sharp angles, as viewed from above, this region being usually smoothly rounded; but this may possibly hereafter prove to be merely individual. Palatal foramina to the level of the front edge of the middle lamina of  $m^1$ . Bullæ decidedly larger than in *varius*, their breadth in the type, taken at right angles to the diagonal length, 4·3 mm.

Incisors rather more proodont than in *varius*, the angle  $78^\circ$  in two specimens as compared with  $72^\circ$ – $75^\circ$ .

Dimensions of the type (measured on the spirit-specimen):—

Head and body 108 mm.; tail 85; hind foot 23·5; ear 18.

Skull: greatest length 29·2; condylo-incisive length 28·2; zygomatic breadth 14·8; nasals  $11 \times 3\cdot2$ ; interorbital breadth 32; breadth of brain-case 13; palatilar length 12·8; palatal foramina 7; upper molar series (worn) 4·8.

*Hab.* Neuquen, Rio Limay, Upper Rio Negro, Patagonia.

*Type.* Old male in spirit. B.M. no. 11.11.19.12. Collected by E. Weiske, 4th November, 1910. Presented by the Hon. N. Charles Rothschild. An imperfect skin, No. 11.11.19.10, also in collection.

*Ann. & Mag. N. Hist.* Ser. 9. Vol. iii. 15

A southern representative of *A. varius*. Greyer than any of the members of the *A. obscurus-lenguarum* group which occur in the intermediate area.

*Akodon benefactus*, sp. n.

Allied to *A. lenguarum*, but smaller.

Character of fur and general colour very much as in *A. lenguarum*, the back equally varying from "fuscous" to dark "buffy-brown," the colouring resulting from a coarse and heavily lined mixture of black and dull buffy. Under surface soiled grey, the bases of the hairs slaty, the tips greyish white, varying to pale drabby along the middle line. Head like back; eye-rings buffy. Ears rather short, of the same general dark colour as head. No contrasted white spot on chin. Hands and feet brownish white, their hairs brownish basally, white at tip. Tail about equalling body without head, upperside blackish, lower dull white.

Skull decidedly smaller than that of *A. lenguarum* and with scarcely any trace of supraorbital ridges such as often develop in old age in that animal. Palatal foramina to the level of the back of the first lamina of  $m^1$ .

Incisors about as in *lenguarum* and *obscurus*, more prominent than in ordinary Akodons, but less so than in *lacteus*, the angle in the type  $84^\circ$ .

Dimensions of the type:—

Head and body 99 mm.; tail 65; hind foot 19; ear 14.

Skull: greatest length 27; condylo-incisive length 26.2; zygomatic breadth 14.3; nasals 9; interorbital breadth 4.3; palatilar length 12.5; palatal foramina 5.7; upper molar series 4.5.

*Hob.* Bonifacio, South-west Buenos Ayres Province; alt. 50 m.

*Type.* Adult male. B.M. no. 16. 10. 3. 35. Original number 2620. Collected 13th May, 1916, by Robin Kemp. Presented by Oldfield Thomas.

This species is related to *A. obscurus* of Uruguay and *A. lenguarum* of Pataguay, but is paler than the former and smaller than the latter.

Mr. Kemp seems to have found this species living in company with *A. arvicola* at Bonifacio, just as I did its relative *A. obscurus* in the neighbourhood of Montevideo.

XVIII.—New South-American Butterflies.

By W. J. KAYE, F.E.S.

**Morphidæ.**

*Morpho perseus demerarae*, subsp. n.

♂ ♀. Altogether paler than *M. perseus metellus*. Fore wing with a pale ochreous shade beyond middle, not involving the first transverse row of ochreous spots (faint in ♂, well defined in ♀) and scarcely extending beyond vein 2, except slightly distally. Inner margin slaty blue basally. Hind wing with the whole of the basal half slaty blue, except for some slight ochreous clouding in middle area near costa.

*Hab.* Demerara, Omai, Essequibo River, 1 ♀; Demerara River, 1 ♂.

Type in Coll. Kaye.

**Erycinidæ.**

*Xgnias potaronus*, sp. n.

Collar orange. Fore wing with all the margins broadly black. Some blue scaling along inner margin. Basal area to beyond middle pale bluish transparent with the veins black. A broad black band across discocellulars. A sub-apical band composed of three large elliptical white spots and a small blue spot at lower extremity. Hind wing with costa broadly black. Inner and outer margin narrowly black. Central area dusky transparent with a faint bluish tinge. Abdomen above blackish; below orange.

Expanse 37 mm.

1 ♂.

*Hab.* British Guiana, Tumatumari, July 1907 (C. B. Roberts).

Type in Coll. Kaye.

*Nymphidium multiochrea*, sp. n.

Fore wing dark brown and orange without any white. A very broad costal brown band to well beyond cell containing orange blotches. Three of these lie within the cell and a fourth lies below the median but touching it on its upper edge. A large orange triangular patch occupies a large area from inner margin towards apex, and is there continued

vertically towards costa. Outer margin dark brown with a faint blue line running through it and some indistinct black intra-neural spots. Hind wing with basal two-thirds pale dirty brownish, palest towards base. A broad orange subterminal band slightly radiated on its inner edge. Outer margin dark brown containing some black spots which are edged internally with blue. Fore wing below with some whitish scaling beyond the cell and stretching across veins 2, 3, and 4. The subterminal orange band merged with the whitish-brown scaling in the area of the tornus. Hind wing below with the basal half whitish gradually becoming dusky before it meets the subterminal orange band.

*Hab.* Lower Amazon, Igaripe (*A. Hall*).

This may be an aberration of *Nymphidium caricæ*, as the underside shows some whitish scaling, but above the general fascies is strikingly different.

Type in Coll. Kaye.

#### Pieridæ.

##### *Pieris phaloe lamonti*, subsp. n.

A small island race of *phaloe*, Godt (= *buniæ*, Bois), which in addition to its small size has no orange at base of fore wing on underside, and only a very small amount of orange at base of hind wing on underside.

A full description is appended of both ♂ and ♀ in case the subspecies should turn out to be a good species and not only a race of *phaloe*.

##### *Pieris phaloe lamonti*.

♂. Fore wing white with the costa for half the length of cell black; the rest of costa (except the very narrow extreme margin, which is black) white. Apex rather broadly black and considerably concave on the inner edge. At termination of veins 3 and 4 on the margin are triangular black marks. A considerably reduced similar mark on vein 2 at margin. A small black discocellular spot slightly extended inwards. Faint scent-scale patches in the interspaces between the veins in discal area. Hind wing white with a very narrow black fringe. Some orange scaling at base beneath and at base of palpi.

♀. Fore wing white with a large black discoidal patch, continued as a curve to costa towards base, but not reaching it. Apex heavily black, the black continued in a zig-zagging

manner to tornus. It is widest at veins 3, 4, extending greatly inwards along vein 4. Between veins 2, 3 it recedes to extreme margin, but forms a black triangular patch on vein 2 and a linear black mark is present along vein 1 *b* at tornus. Hind wing white with a broad but much broken black margin. A long curved black streak along vein 8 almost throughout its length, except at origin. A black shade along vein 4 just beyond end of cell. Hind wing below cream-coloured, with a strong orange patch at base and black streaks as above, but paler.

Expanse ♂ 72, ♀ 75 mm.

*Hab.* Trinidad, Morne Diable, 9. 4. 17 (Sir Norman Lamont).

I have named the species after Sir Norman Lamont, who discovered it on Morne Diable, where he had made numerous fresh records for the island.

Types, ♂ and ♀, in Coll. Kaye.

#### Heliconiids.

##### *Heliconius doris doris*, ab. *gibbsi*, nov.

Fore wing like typical *doris* from Guiana, except that all the markings are completely white. The basal streak along the median being considerably suffused with black scaling. Hind wing normal *doris* with the blue scaling extending on either side of the veins beyond the cell area.

*Hab.* British Guiana, Friendship, Berbice River.

Type ♀ in Coll. Schmassmann.

This very rare form, which is parallel to *H. doris metharmia*, ab. *fascinator*, from N.W. Venezuela, was given unsuspectingly by the late Mr. A. E. Gibbs with many other *doris* to Mr. Schmassmann shortly before he died.

I have named the aberration after the late Mr. A. E. Gibbs.

##### *Heliconius wallacei brevimaculata*, ab. *halli*.

Fore wing like *brevimaculata*, with the short median band white in place of the usual yellow, broken by the extra dark scaling along vein 2. Hind wing like typical *wallacei*.

*Hab.* Lower Amazon, Serpa, March 1914 (A. Hall).

Type ♀ in Coll. Schmassmann.

This form is close to *clytia*, but as *brevimaculata* is a geographical race on the lower Amazon it is necessary to describe and record the occurrence of an accompanying white form.

I have named this aberration after Mr. A. Hall.

*Heliconius burneyi serpens*, subsp. n.

♀. Fore wing as in *H. burneyi burneyi*. Hind wing intermediate between *H. burneyi catharinæ* and *H. burneyi huebneri* with short streaks beyond the median vein, never extending more than half the distance to outer margin.

♂. With even shorter streaks and approaching nearer to *catharinæ* than to *huebneri*.

*Hab.* Lower Amazon, Serpa, Jan.-March, 1914 (*A. Hall*).  
Type in Coll. Kaye.

A series of males and females was taken by Mr. Hall and all the specimens are intermediate between *huebneri* and *catharinæ* showing that the race is a very well-marked one.

XIX.—*Some new Species of the Homopterous Family*  
*Pyrrhocoridae*. By W. L. DISTANT.

## Genus ODONTOPUS.

*Odontopus*, Laporte, Ess. Hem. p. 37 (1832).

*Probergrothius*, Kirk., n. n., Kirk. Entomologist, xxxvii. p. 280 (1904).

A genus under the name of *Odontopus* was proposed in the same year (1833), according to Scudder, by both Laporte (*Rhynchota*) and Silbermann (*Coleoptera*), Kirkaldy (*supra*) giving priority to Silbermann and sinking Laporte's generic name, for which he proposed the novelty of "*Probergrothius*."

Allaud, however, in 1889 (*Bull. Ent. Soc. Fr.* p. xlv) had shown that Laporte's name had priority over that of Silbermann, for which he substituted the generic name *Odontopezus*, and which is now used in the *Heteromera* (*Coleoptera*). Consequently Kirkaldy's name "*Probergrothius*" is another synonym.

*Odontopus antananarivos*, sp. n.

Head and pronotum testaceous, anterior pronotal constricted area ochraceous; scutellum and corium ochraceous, base of scutellum, and more than apical third of corium black, lateral margins of remainder of corium testaceous; membrane bronzy brown; body beneath ochraceous, head beneath, rostrum, and femora testaceous; tibiæ and tarsi black; antennæ with the first, second, and third joints black, extreme base of first joint testaceous, first joint moderately

thickened towards apex, second joint longer than first or third, fourth mutilated; rostrum reaching posterior coxæ; posterior angle of corium somewhat convexly angulate; lateral pronotal margins distinctly and somewhat broadly and roundly emarginate; tibiæ and tarsi distinctly palely pilose.

Var. Pronotum ochraceous, the lateral and posterior margins only testaceous; membrane black.

Long. 19 mm.

Hab. Madagascar; Antananarivo.

*Odontopus stramineus*, sp. n.

Ochraceous; anterior and posterior margins of the anterior pronotal constricted area narrowly black; two brown spots to corium—one transverse outside clavus, the other smaller and rounded before apex, membrane very pale ochraceous; antennæ wholly ochraceous, first, second, and fourth joints subequal in length, third shortest; membrane only just passing the anterior margin of the penultimate abdominal segment, rostrum reaching the intermediate coxæ; anterior femora moderately incrassated and strongly spined beneath on apical halves.

Long. 16 mm.

Hab. Sikkim (Atkinson Coll.).

I refrained from describing this species in the Faun. Brit. India, in the unsatisfied anticipation that I might receive another or more specimens. The abbreviated membrane and the moderately incrassated and spinous anterior femora almost indicate another genus. In general appearance and markings it is allied to *O. scutellaris*, Walk., and *O. binotatus*, Stål.

*Odontopus confusus*.

*Odontopus confusus*, Dist. Ann. & Mag. Nat. Hist. (7) ix. p. 39 (1902).

*Odontopus schoutedeni*, Bergr. Ann. Soc. Ent. Belg. xlvii. p. 290 (1903).

The specimen given specific rank by Bergroth (*supra*) is only a colour-variety of *O. confusus*. The black longitudinal vitta to the head is not of unusual occurrence, and the British Museum now contains a series of such varietal specimens acquired since I described the species. The first joint of the antennæ, I find by the examination of later specimens, is also sometimes sanguineous as originally described, sometimes with its apical area black and sometimes wholly black. It has a somewhat wide distribution in East Africa.



## Genus SERICOCORIS.

*Sericocoris*, Karsch, Entom. Nachr. 1892, p. 193.*Hathor*, Kirk. & Edw. Wien. Ent. Zeit. xxi. p. 168 (1902).*Sericocoris flavipes*.*Dysdercus flavipes*, Sign. Thoms. Arch. ent. ii. pp. 308, 587 (1858).*Odontopus flavipes*, Stål, Hem. Afr. iii. p. 7 (1865).*Hab.* W. Africa.*Delacampius militaris*, sp. n.

Head black; pronotum fuscous brown with the lateral margins testaceous; scutellum black; corium testaceous, clavus (excluding base) and a large semi-ovate spot connected with posterior half of clavus black; membrane black; sternum fuscous brown, abdomen beneath, rostrum, and legs a little paler; antennæ with the first, second, and third joints fuscous brown, fourth joint greyish white with its apex fuscous, first, second, and fourth joints almost subequal in length, third shortest; pronotum with the posterior area strongly coarsely punctate, and with a short, discal, longitudinal carination, lateral pronotal margins distinctly concavely sinuate; clavus somewhat sparsely and coarsely punctate; rostrum reaching posterior coxæ.

Long. 7 mm.

*Hab.* N.W. New Guinea (*A. R. Wallace*).*Delacampius ethiopicus*, sp. n.

Body above, head beneath, sternum, rostrum, and legs dark chocolate-brown; antennæ fuscous brown; extreme base of first joint of antennæ, coxæ, trochanters, and abdomen beneath ochraceous, posterior margins of sternal and abdominal segments pale ochraceous; pronotal margins, apex of scutellum, basal-lateral margins and angulated posterior margins of corium pale testaceous; membrane black; antennæ with the first, second, and fourth joints almost subequal in length, third joint distinctly shortest; rostrum almost reaching the posterior coxæ; lateral margins of the pronotum moderately concavely sinuate, the posterior lobe and the corium finely punctate; membrane reaching the abdominal apex.

Long. 7-8 mm.

*Hab.* Cameroons (*Escalera*). Gambia (*J. J. Simpson*).*Delacampius rhodesianus*, sp. n.

Black; pronotal margins, basal-lateral, apical-claval, and angulated posterior margins of corium pale ochraceous; head

beneath and sternum black, sternal segmental margins and the coxæ pale ochraceous; abdomen beneath dark ochraceous, lateral margins testaceous and inwardly broadly black, posterior segmental margins pale ochraceous; antennæ with the first, second, and third joints black, third shortest, fourth mutilated; head somewhat elongate, its apex sanguineous; lateral margins of the pronotum distinctly upwardly laminate, but practically non-sinuate; membrane about or almost reaching abdominal apex; connexivum sanguineous.

Long. 8 mm.

*Hab.* N.E. Rhodesia; Serenje Distr. (*Neave Coll.*).

Allied to the preceding species, *D. æthiopicus*, Dist., but besides the different colour-markings it differs by the non-convexly sinuate lateral margins of the pronotum.

#### DINDYMELLUS, gen. nov.

Head elongate, anteriorly depressed, central lobe prominent and apically broadened, not constricted or impressed beneath; antennæ robust, first, second, and fourth joints longest and subequal in length; rostrum robust, long, passing the posterior coxæ, first joint about reaching base of head, second joint a little longest, third and fourth shortest; pronotum about as long as broad at base, the lateral margins acutely reflexed, basal margin about or nearly twice as broad as anterior margin, obscurely transversely impressed near middle; scutellum triangular, centrally about as long as broad; corium with the lateral margins moderately ampliate; membrane reaching abdominal apex; abdomen with the posterior margins of the second, third, and fourth segments very strongly, convexly, obliquely, and upwardly directed at their lateral areas.

Allied to *Dindymus*, Stål.

#### *Dindymellus coimbatorensis*, sp. n.

Brownish testaceous; antennæ piceous, basal area of apical joints luteous; eyes black; lateral margins of pronotum and about two-thirds of lateral margins to corium sanguineous, the latter with the extreme margin and about posterior third (narrowly) luteous; membrane fuscous brown; body beneath, legs, and rostrum fuscous brown; coxæ, trochanters, lateral margins of sternum and base of abdomen sanguineous; rostrum with the first and second joints reddish ochraceous, third and fourth joints fuscous brown; antennæ with the first, second, and third joints moderately thickened on their apical areas, fourth joint more slender and cylindrical; head practically impunctate; pronotum with a few scattered punctures on the basal area, where there is also a short,

median, longitudinal ridge; tibiæ finely spinulose; anterior femora incrassated with three prominent spines beneath at apex.

Long. 17 mm.

Hab. South India; Coimbatore (T. V. Campbell).

*Syncroetus circumscriptus*, Bergr. Proc. Roy. Soc. Vict. vii. p. 293 (1895).

Bergroth described this genus and species from a ♀ or ♀ specs., and his description requires some emendation. In the male the membrane reaches the abdominal apex and is considerably smaller than the other sex. "Rufo-castaneus" cannot be accepted as the predominant colour as stated by Bergroth, for the head and pronotum, in some cases the anterior lobe only, are black.

Long., ♂ 6, ♀ 9 mm.

Hab. Queensland; Kuranda (F. P. Dodd).

## XX.—Some Parthenogenetic Chironomidæ.

By F. W. EDWARDS.

So far as our present knowledge goes, parthenogenesis is of somewhat rare occurrence among the Diptera, but several instances of it have already been recorded in Chironomidæ, in the genera *Tanytarsus* and *Corynoneura*. In the case of *Tanytarsus* the first observations were made by Grimm in 1870, and have more recently been confirmed and extended by Zavrel (*vide* Bause, Archiv für Hydrobiol., Suppl. Bd. ii. 1913, p. 17). The observations of both these writers concern the rare phenomenon of pupal parthenogenesis. Zavrel found that in the summer broods of *Tanytarsus boiemicus*, Kieff. MS., eggs could be produced parthenogenetically either by the pupa or by the imago very shortly after emergence; the pupæ were often found floating dead on the water full of developing eggs, from which larvæ eventually hatched. In all cases the adults reared from such larvæ proved to be females.

Another case of parthenogenesis—in this instance of a more normal type—has been recorded by Goetghebuer as occurring in *Corynoneura celeripes*, Winn. (Bull. Acad. Roy. Belg. 1913, pp. 231-233). This author was able to rear three successive generations of parthenogenetically produced eggs, which in every case yielded female adults.

These, I believe, are the only cases so far placed on record of the occurrence of parthenogenesis in this family of the Diptera; but I am now able to add two others.

*Chironomus clavaticrus*, Kieffer.

(*Tanytarsus flexilis*, Bause, ? Linné.)

During the month of May 1917 I collected some weeds and mud from a pond at Letchworth, Herts, in the hope of being able to discover the larvæ of certain Culicidæ, but was then only able to rear various species of Chironomidæ from the material. Among these were a number of specimens of a species which I determined later as *Chironomus clavaticrus*, Kieff. (Bull. Soc. Nat. Hist. Metz, xxviii. 1913, p. 17). My interest in these was aroused in the first place by the fact that this very distinctively marked species had not been recorded from Britain, and was quite unrepresented in the collections at the British Museum and at Cambridge. Secondly, it was noticeable that all the specimens which hatched (about forty) were females. Suspecting that this might be a case of parthenogenesis, I isolated a few pupæ in a small closed receptacle. Two females hatched, and each of these deposited an egg-mass. From these eggs larvæ developed which produced female adults on August 16; eggs were laid parthenogenetically on Aug. 18, and produced larvæ on August 28. These for the most part died young, owing, I believe, to lack of food; a few lived through the winter and became full-grown in June 1918, but for some reason unknown to me no adults hatched from them.

I made a diligent search by sweeping with a net in the neighbourhood of the pond where the larvæ were obtained, but succeeded in finding only female specimens, and am inclined to believe that in this locality at least no males occur. It is interesting to note that the species was originally described by Kieffer from females only, reared from larvæ by Thienemann. It was also reared by Réaumur from larvæ collected near Paris; he figures the larva and the female adult (Hist. Ins. iii. p. 179, pl. xiv. figs. 11-16). No other records of the adult of *C. clavaticrus* have been made, and the species is thus known only in the female sex at present.

The discovery of the male—supposing it to exist—would be a matter of some interest, since it might give a further clue to the correct generic position of the species. From the characters of the adult female alone, and particularly on account of the entirely bare wings, Kieffer was no doubt

justified in allocating it to *Chironomus*, but in its larval and pupal stages the species shows a much greater relationship to *Tanytarsus*. The early stages of *C. clavaticrus* have, indeed, been described in detail by Bause (Archiv für Hydrobiol., Suppl. Bd. ii. p. 73, 1913)\* as those of a *Tanytarsus*, which, on the authority of Thienemann, he calls "*Tanytarsus flexilis*, Linné," though he states that the larvæ have not yet been reared. Why Thienemann adopts this name, which has usually been allotted to a totally different species of *Chironomus*, is far from clear; but, since Bause states that Thienemann himself intends to give reasons for the identification in a later publication, I refrain from comment at present.

To the accounts given by Réaumur, Lauterborn, and Bause of the early stages of this species I can add the following points:—The egg-mass is about 6 mm. in length, 1 mm. broad, pointed at each end; those I observed adhered by one end to water-weeds, but whether this was accidental or whether they were fixed in this position by the fly I could not determine. The eggs in the egg-mass are arranged in a rather indefinite spiral; counts of the number in two separate masses showed 182 and 163 respectively. The larvæ emerge from the egg through a longitudinal fissure, and when newly hatched are about 0.6 mm. long and practically colourless, there being only small patches of yellowish-green granules at the sides of abdominal segments 2-7 and along the sides of the intestine; they have no trace of ventral blood-gills or of the hump on the eighth abdominal segment; "Lauterborn's organs" are present at the apices of the second and third antennal joints, as in the full-grown larva. The second stage larva much resembles the first †, but is a little over 1 mm. long, and has a slight hump on the eighth abdominal segment and a slight red tinge behind the head and in the middle of the body. In the third stage the red colour of the body is more widely spread, but not strong; the hump on the eighth abdominal segment is well developed, and blood-gills are present on the seventh segment, but are as yet colourless and have not their full length. The

\* The early stages of *C. clavaticrus* apparently agree in every respect with Bause's description and figures of *T. flexilis*, but there is, of course, a possibility that there may be two closely allied species.

† Miall and Hammond state ('Harlequin-fly,' p. 176) that the peculiarities of the newly-hatched larva disappear after the first moult. It is just possible that what I regarded as second-stage larvæ are merely first-stage individuals which have grown in size.

newly hatched larva, as soon as it has freed itself from the jelly of the egg-mass, loses no time in making itself a case. I was not fortunate enough to observe the process of formation, but apparently these cases consist chiefly of salivary secretion, to which minute particles adhere. Since I could never find any small empty cases, I am led to believe that the larva increases the size of the original case as it grows; but more observations are needed on this point, since the material of the case does not seem to be particularly elastic. The larva can turn completely round in its case and protrude its head from either end; in moving about from place to place it sometimes comes out as far as the fifth or sixth abdominal segment, but I never saw one completely leave its case—in fact, it is probable that the hump on the back of the eighth and the large ventral blood-gills on the seventh segment would prevent its being able to do so.

Before pupation the larva usually moors its case by one end in such a position that the other end is close to or touching the surface of the water. The pupa leaves the larval case only a short time before the emergence of the adult (I have not seen a free pupa, but have only found the skins floating on the surface of the water). A very noteworthy point is that the larva skin seems never to be completely shed, but remains attached to the abdomen of the pupa; pupæ removed from their cases, as well as cast pupal skins collected on the surface, always had the larval skin attached\*.

The adult, when freshly emerged, has still much of the blood-red colour of the larva—which, indeed, is the case with other Chironomidæ having blood-red larvæ. Another point worthy of special remark is the resting position of the adult fly, the front legs being held in a peculiar manner which I have not observed in any other Chironomid. The front femora are directed straight forwards, so that their clubbed tips almost or quite touch in front of the head; the tibiæ and tarsi are bent right back at an angle of about 40° with the body. A somewhat similar posture is adopted by some small species of *Tanytarsus*, which hold their front tibiæ and tarsi at right angles to the body; but I do not know of another instance in the Chironominae in which the normal manner of holding the front legs is departed from.

\* Miall and Hammond, in their monograph on the 'Harlequin-fly' (p. 139), note that "occasionally the larval skin is still adherent to the pupa when the fly emerges."

*Corynoneura innupta*, sp. n.

Though this species is not at all uncommon in the Letchworth district of Hertfordshire, it appears not to conform to any of the published descriptions of European species; it may be diagnosed as follows:—

♀. General colour bright yellow. *Head* black behind; face brownish yellow; palpi yellow; antennæ six-jointed, basal joint black, joints 2-5 yellow, oval, not quite twice as long as broad; last joint somewhat darkened, pointed, more than three times as long as broad. *Thorax* yellow; mesonotum with three rather widely separated black stripes, the middle one extending from the front margin halfway to the scutellum; base of scutellum, apical half of postnotum, also the mesosternum blackish. *Abdomen* yellow; the tergites rather broadly blackish grey towards the base. *Legs* pale; extreme tips of femora, tibiæ, and tarsal joints rather indistinctly darkened; front tibia about 1.7 times the length of the metatarsus. *Wings* clear; R extending very slightly beyond the middle of the wing; Cu forking noticeably beyond the tip of R.

Length 0.9 mm.

*C. innupta* must evidently bear a close general resemblance to *C. scutellata*, Winn., and *C. pumila*, Wulp (both of which are unknown to me), but these two are said to have the scutellum yellow at the base instead of the apex, and there are some other points in the published descriptions which seem to indicate that our insect cannot be the same as either.

In the autumn of 1917 I reared a few females of this species from the same pond from which I had obtained *Chironomus clavaticrus*. Again, in the spring of 1918 *Corynoneura* larvæ appeared in a breeding-jar for mosquito-larvæ. These latter were collected in a temporary puddle in a copse at Arlesey, Beds, and were supplied with dead leaves and water from a ditch (also temporarily full) in my garden at Letchworth. I do not know from which locality the *Corynoneura* larvæ originated. I have also swept female specimens from vegetation at the lakeside at Radwell, Herts.

From the larvæ in this jar, which was kept closed the whole time, about fifty specimens emerged in the early part of June, all of which were females; probably they were the offspring of a specimen which hatched unnoticed earlier in the year, since the material was collected early in April. Some of the pupæ were isolated, and both the specimens which hatched from them and the others in the main receptacle deposited egg-masses which produced larvæ about

June 19. Between July 5 and July 14 about seventy adults had hatched from these larvæ, again all females; these, again, produced egg-masses parthenogenetically, and another generation of flies (twenty specimens, all females) appeared at the end of July. A third parthenogenetically produced generation appeared about August 20 and a fourth about August 31. From this time until early October flies and larvæ were almost continually present (though in decreasing numbers), so that it became impossible to distinguish the separate generations; but it would be safe to say that there were at least five parthenogenetic generations during the year, and though a careful watch was kept on the breeding-jar, no males were seen.

The metamorphoses of *Corynoneura* are well known, and nothing need be said concerning this species, except that the food of the larvæ appeared to consist of rather large infusoria (*Paranecium*?) which swarmed in the breeding-jar. The larvæ could be watched under a lens apparently chasing the infusoria, though I could never be quite certain that they swallowed them. When the numbers of the infusoria diminished, the *Corynoneura* larvæ also became much scarcer. Both had disappeared entirely by the middle of October.

During the summer of 1918 I also reared a small number of males and females of *Corynoneura celeripes*, Winn. (or what I believe to be this species), from the pond which had provided me in 1917 with the first *C. innupta*, and also earlier with *Chironomus clavaticrus*. This species (*Corynoneura celeripes*), as already mentioned in the introduction, has been found by Goetghebuer to be occasionally parthenogenetic\*, but I could obtain no evidence that such was the case with any of my specimens. Newly hatched females isolated in separate tubes did not deposit egg-masses, nor did they do so after males had been placed in the tubes with them. It would appear that in this locality *C. celeripes* has not the power of parthenogenesis, and the fact that I failed to obtain any eggs at all may be explained by the not unlikely assumption that it will not pair except under certain natural conditions.

The species which I regard as *C. celeripes* appears to be

\* Since the European species of *Corynoneura* have not yet been critically studied, it is, of course, possible that Goetghebuer's species was really the same which I have here described as *C. innupta*, rather than the one I regard as *C. celeripes*. Should that be the case, there is nothing new in my observations, but they would still form an interesting confirmation of Goetghebuer's.



identical with *C. innupta* in all structural characters, differing only in the much blacker colour of the whole body, which is exhibited particularly in the broad confluent mesonotal stripes. It is a matter for speculation whether *C. innupta* may not be a pale parthenogenetic form of *C. celeripes*. However, it would seem to be impracticable to test this possibility, since the male *celeripes* (= *atra*, Winn.) appears equally indifferent in captivity to females of *celeripes* or *innupta*.

In considering the question of parthenogenesis in *Corynoneura*, it may not be out of place to mention that a species exists in this country in which the males and females are similar in coloration, and in which, moreover, the male antennæ are hardly more hairy than those of the female. Bred specimens of this species (which is apparently undescribed) were sent me by Prof. J. W. Carr in 1914, and, being under the impression that all were females, I was at first inclined to regard this as another possible case of parthenogenesis; it was only on mounting a specimen for detailed study that presence of males was discovered. In the case of *C. innupta*, however, the occurrence of parthenogenesis is indisputable; since the females hatched from isolated pupæ produced eggs, there is no room for error on account of similarity of the sexes.

The question as to the origin of parthenogenetic species or varieties is too obscure to be profitably discussed, but, given the existence of forms which are capable of asexual reproduction, it is easy to understand how the male sex may be eliminated in a part or in the whole of the range of the species. It has been pointed out by Williams\* that many insects will not pair except under special conditions of space, heat, moisture, etc., and that under the abnormal conditions encountered in Nature by the spread to new localities of a female-producing parthenogenetic race, the male sex may be gradually lost. According to this suggestion, the apparent non-existence of males of *C. clavaticrus* (and perhaps of *C. innupta*) might be due to their having spread from some centre where both sexes existed, and where conditions were favourable to pairing. Another possible explanation would be that climatic conditions prevented pairing during the whole of one flight-season, leaving only unfertilized females to perpetuate the species.

\* C. B. Williams, "Some Problems of Sex Ratios and Parthenogenesis," *Journal of Genetics*, vi. 1917, pp. 255-257.

